THE SCAPHOPODA OF THE SIBOGA EXPEDITION

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SCAPHOPODA OF THE SIBOGA EXPEDITION

TREATED TOGETHER WITH THE KNOWN INDO-PACIFIC SCAPHOPODA

BY

D^R. MARIA BOISSEVAIN
De Bilt (Utrecht)

With six plates and 39 textfigures

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INTRODUCTION.

Dealing with the Scaphopods obtained during the cruise of H. M. S. "Siboga" in the East Indian Archipelago, I have thought it practical to include at the same time the species already known from that region. In doing this I have expanded the narrow geographical range of the East Indian Archipelago to a wider field of exploration, marked by more natural limits. The following region has therefore been adopted:

The East Indian Archipelago with New Guinea and the Philippines, limited eastward by the East point of New Guinea at about a longitude of 150°, north and southward by the tropics of Cancer and Capricorn. Westward, this region continues along the south coast of Asia, including the China Sea, the Gulf of Siam, the Bay of Bengal, the Arabian Sea with the Persian Gulf, the Red Sea, and the Indian Ocean between the tropics up to the East coast of Africa.

From this region 59 species and 3 varieties of species had already previously been described and 40 species and two varieties are now added by the Siboga Expedition, 36 of which are new to science, and 2 varieties, while 4 species had already been reported from other parts of the globe or were known in fossil state. Here follows a list of all the species entered in this Report; those with an asterisk have not been obtained by the Siboga.

**Dentalium elephantinum.*
**D. formosum.*
D. aprinum (shore).
D. aprinum var. *incolor* nov. var.
D. interstriatum (shore).
**D. Letsonae.*
**D. hexagonum.*
**D. hexagonum* var. *sexcostatum.*
D. minus nov. spec. 82 Metres.
**D. pseudosexagonum.*
**D. porcatum.*
**D. duodecimcostatum.*
D. Michelottii nov. rec. spec. 411 Metres.
**D. Cheverti.*
**D. katowense.*
**D. octangulatum.*
D. javanum (shore).
D. tubiforme nov. spec. 462 Metres.
D. oryx nov. spec. 216 Metres.
D. leucoryx nov. spec. 34 Metres.
**D. cancellatum.*
**D. intercalatum.*
**D. Macandrewi.*
D. sinuosum nov. spec. 94 Metres.
D. robustum.
**D. Lessoni.*
D. pluricostatum nov. spec. 141 Metres.
**D. decemcostatum.*
D. tasmaniense. 216 Metres.
**D. bisexangulatum.*
D. Cookei 75—148 Metres.
D. paucicontortum nov. spec. 522 Metres.
D. transversostriatum nov. spec. 462 Metres.
**D. Shoplandi.*
D. malayanum nov. spec. 918 Metres.
D. sedecimcostatum nov. spec. 400—4000 M.
D. compressiusculum nov. spec. 1570 Metres.
D. Martensi nov. spec. 1300—4391 Metres.
**D. clathratum.*
**D. multistriatum.*
**D. Belcheri.*
**Dentalium variabile.*
D. dispar. 54 Metres.
**D. quadricostatum.*
D. dipsycha. 18 Metres.
D. quadrapicale (shore).
D. tetrapleurum nov. spec. 9 Metres.
D. entalis var. *indicum* nov. var. 411 Metres.
**D. magnificum.*
D. profundorum 1301 Metres.
D. Hungerfordi. 275 Metres.
D. Sibogae nov. spec. 411 Metres.
D. aciculum. 959 Metres.
D. usitatum. 918—1158 Metres.
D. acutissimum. 918—1301 Metres.
D. subrectum. 9 Metres.
D. carneum nov. spec. 918 Metres.
D. tricarinatum nov. spec. 800—1886 M.
D. eburneum. 9 Metres.
**D. longitrorsum.*
**D. lacteum.*
D. banule nov. spec. 918 Metres.
**D. bisinuatum.*
D. stapes nov. spec. 462 Metres.
D. insolitum. 450—918 Metres.
D. pachypleurum n. sp. 1788—1886 Metres.
D. truncatum nov. spec. 397 Metres.
D. tracheatum nov. spec. 600—1886 Metres.
D. semitracheatum nov. spec. 600—918 M.
D. subtorquatum 90 Metres.
D. anulosum. 694 Metres.
**D. politum.*
D. stenoschizum. 27 Metres and less.
D. tenuifissum. 9—141 M.
Entalina quadrangularis nov. spec. 1300 M.
E. platamodes. 835—2798 Metres.
**E. mirifica.*
E. cornucopiae nov. spec. 959 Metres.
E. mediocarinata nov. spec. 397 Metres.
Siphonodentalium australasiae nov. spec. 1158 Metres.
**S. eboracense.*

Cadulus dichelus.
C. ovalis nov. spec. 91 Metres.
**C. prionotus.*
**C. minutus.*
C. hexaschistus nov. spec. 835 Metres.
C. magnus nov. spec. 794—1301 Metres.
C. longilobatus nov. spec. 36 Metres.
**C. simillimus.*
**C. euloides.*
**C. gadus.*

**Cadulus clavatus.*
C. colubridens. 1886 Metres.
C. virginalis nov. spec. 828—1886 Metres.
C. pseudolivi nov. spec. 1158 Metres.
**C. anguidens.*
C. zonatus nov. spec. 310—2796 Metres.
C. pulcherrimus nov. spec. 694 Metres.
**C. singaporensis.*
C. abrupto-inflatus nov. spec. 330 Metres.
**C. laevis.*

Of the 59 species already known from our field of exploration 21 have been refound by the Siboga. This proportionally small number is due to the fact that the Siboga collection principally consists of deepsea forms, the greater part of which is new, while the shore forms naturally better known to early investigators are only represented by a few forms. Thus, forms like *D. elephantinum, formosum, bisexangulatum, octangulatum, hexagonum* and many others evidently of no unfrequent occurrence on the shores of the East Indian Archipelago cannot be recorded by the Siboga; on the other hand 40 out of the 58 species obtained by the Siboga are from the deepsea.

Nearly all the subgenera into which the Genus *Dentalium* is divided are represented; of two subgenera, untill now only known in fossil state, species have been found. The first is *Plagioglypta* a very antique group with species principally occurring in the early mesozoic. The second is *Gadilina* formerly held for one of the Siphonodentalidae but which is now proved to belong to the Dentalidae and is reported from the Tertiary of North Italy and Java. Some species of other groups also bear a great resemblance to fossil species of the Italian Tertiaries. Thus *Entalina quadrangulis* Boiss. is nearly allied to *Dentalium tetragonum* Brocchi, while one species *Dentalium Michelottii* could be identified with the Italian fossil form.

Four species must be reported, occurring also in other parts of the earth. The first is *Dentalium stenoschizum* P. & Sh. a coast form of no unfrequent occurrence, reported from the West Indies.

The second is *Dentalium tenuifissum* Mont. also a coast form, reported from the Mediterranean. Though it may seem strange that these shallow water forms should be so widely distributed, I do not believe that the case is doubtful.

The third is *Entalina platamodes* Watson. This is a deepsea form occurring also in the deepsea of the West Indies, a fact which stands no more alone. The fourth is a variety of *Dentalium entalis* L., a species distributed over the northern parts of the eastern and western Atlantic and a frequent shore form but also occurring in great depth. Our variety was dredged at a depth of 411 Metres.

To my regret I must add a short list of species of which I could not state with certainty, whether they may not be identified with American forms. I have not been in the opportunity of comparing types of those species with the Siboga specimens and therefore must leave it to

the future to establish the truth about these forms. They are: *Dentalium transversostriatum* which bears a great resemblance to *D. carduus* Dall a West Indian species, *Dentalium carneum*, greatly resembling *D. innumerabile* Pilsbry & Sharp, and reported from Panama Bay and Lower California and *Cadulus hexaschistus* resembling *Cadulus spectabilis* Verrill, reported from the Atlantic, east of New Jersey and near St. Vincent, W. Indies in 464 fms.

This Report only means to give a systematic outline of all the Scaphopods occurring in the above defined area. For anatomical data I refer to the following list:

1825. DESHAYES. Monographie du Genre Dentale. Mém. de la Soc. d'Hist. Nat. de Paris, II.

1856. LACAZE-DUTHIERS, H. Histoire de l'organisation et du developpement du Dentale. Annales d. Sc. nat. Zoologie, Tome VI, p. 225 and p. 319.

1857. The same. Tome VII, p. 1 and p. 171.

1889. FOL, H. Sur l'anatomie microscopique du Dentale. Arch. de Zool. expér. et gén., Ser. 2, Tome VII, 1889. p. 91.

1892. PLATE, L. Über den Bau und die Verwandtschaftsbeziehungen der Solenoconchen. Zool. Jahrb. Bd V, p. 301.

1892—94. SIMROTH, H. Scaphopoda. BRONN's Kl. und Ordn. d. Tierreichs, Bd III, p. 356.

1894. —— Bemerkungen über die Morphologie der Scaphopoden. Zeitschrift f. Naturw., Bd LXVII, p. 239.

1898. PELSENEER, P. Recherches morphologiques et phylogénétiques sur les Mollusques archaiques. Gand p. 58.

1903. BOISSEVAIN, M. Beiträge zur Anatomie und Histologie von *Dentalium*. Jenaische Zeitschr., Bd XXXVIII, N. T. XXXI.

I only want to call attention to the fact that many authors apply to the shell the terms dorsal and ventral contrary to the position of the living animal. The tubular shell, open at both ends and posteriorly attenuated is generally slightly curved. The outer or convex curve, answers to the ventral, the inner or concave curve to the dorsal side of the living animal. The figure shows the animal in its natural position; anteriorly it bores itself into the mud or sand, inclining on the ventral face.

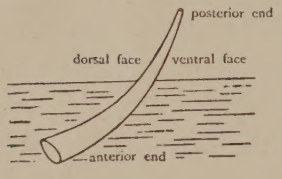


Fig. 1.

My work has been greatly facilitated by the excellent Monograph on the Scaphopods of Messrs PILSBRY & SHARP, published in the year 1897. I have followed this book in its general outline, keeping with only few exceptions the same divisions and subdivisions. Also have I made use of Mr. PILSBRY's translations when a diagnosis of a species was published in an other language than English, and some of the keys with some slight alterations have been taken from it. In a few cases of long and well-known species I have saved myself the trouble of controlling the long list of literature but have simply transcribed parts of it on the authority of Mr. PILSBRY.

I want to thank Mr. E. A. SMITH for the kind assistance he gave me during my visit at the British Museum, a visit I shall always keep in grateful remembrance, and Mr. SIDNEY

F. HARMER for his kindness during my stay at Cambridge and for afterwards sending some of the desired type specimens for further investigation.

I must also thank Mr. JOUBIN, Director of the Mus. d'Hist. Nat. of Paris and Mr. SACCO of the Palaeontological Museum of Torino for supplying me with material for comparison.

I am greatly indebted to Prof. C. PH. SLUITER for admitting me for my study to a part of his Zoological Laboratory, for which kindness I here express my thanks.

Lastly I thank Prof. MAX WEBER for trusting me with this collection of Scaphopods to deal with and for the valuable assistance, good advice and great friendship he has rendered me during my work.

SCAPHOPODA.

Shell tubular, open at both ends, attenuated at the posterior end, more or less curved, the concave side dorsal.

I. Family DENTALIIDAE.

Width of the median tooth of the radula double its height. Tooth with an encircling epipodial sheath which is discontinuous, interrupted on the side next to the head. Shell greatest in diameter at the oral opening.

II. Family SIPHONODENTALIIDAE.

Width of median tooth much less than double its length, generally less than the length. Foot vermiform, capable of expansion into a terminal or subterminal rosette-like disk, not interrupted dorsally. Shell generally smooth, or if ribbed tri- or pentagonal, often inflated.

I. Family DENTALIIDAE.

Dentalium L. 1758.

The genus *Dentalium* is coextensive with the family *Dentaliidae*.

Key to subgenera.

I. Shell longitudinally ribbed or striated.

- *a*. Number of the ribs near apex generally not exceeding 20 . *Dentalium* s. s. . p. 7
- *a'*. Ribs more numerous, often a long slit on the convex side . *Fissidentalium* . . p. 36
- *a''*. Shell square at and near the apex . . . . . *Tesseracme* . . . p. 39
- *a'''*. Shell finely striated near the apex, anteriorly quite smooth. *Antalis*, *Graptacme*. p. 43 [and 44

II. No longitudinal sculpture.

- *a*. Shell triangular or subtriangular in section. . . . . *Gadilina*. . . . p. 49
- a^1. Shell conspicuously laterally compressed. . . . . *Bathoxiphus* . . p. 48

a^2. Shell transversely ribbed, especially near the apex . . . . . *Plagioglypta.* p. 55
a^3. Small shells, extremely attenuated, or truncated with a small accessory tube . . . . . *Episiphon* . p. 46
a^4. Shell cylindric, smooth or with deeply incised growth lines; a long slit on the convex side. . . . . *Fustiaria.* . p. 58
a^5. Shell cylindric, quite smooth, or with numerous low annular swellings. *Laevidentalium.* p. 51
a^6. Shell smooth, solid, slightly notched on the convex side with a short supplemental tube . . . . . *Antalis* . . p. 43

Dentalium s. s. is divided into the following groups:

Dark green or strongly coloured species, with 8—17 strong ribs.	Group of *D. elephantinum.*
Hexagonal at and near the apex.	Group of *D. hexagonum.*
Sevenribbed at and near the apex	Group of *D. katowense.*
Octagonal at and near the apex.	Group of *D. octangulatum.*
Six to fourteen-ribbed at and near the apex	Group of *D. bisexangulatum.*
Fourteen to twenty-one ribs at and near the apex.	Group of *D. shoplandi.*
Small forms, finely striated, often with alternating translucent and opaque bands on the riblets	Group of *D. multistriatum.*

Group of D. ELEPHANTINUM.

Shell solid, decidedly coloured, generally green, with 8—17 strong longitudinal ribs. Ribs generally stronger on the concave side. Apex with or without notch.

I. Greatest diam. about $^1/_6$ the total length.
  a. Shell dark green, pale at apex with about 10 ribs . . . . . *elephantinum.*
  b. Shell red, green and white with 13—16 strong ribs . . . . . *formosum.*
II. Greatest diam. about $^1/_{12}$ the length.
  a. 8—13 longitudinal continuous ribs.
    b interstitial sculpture weak . . . . . *aprinum.*
    b' secondary and small tertiary riblets . . . . . *interstriatum.*
  a'. 17 ribs at apex . . . . . *Letsonae.*

[1]) *1. *Dentalium elephantinum* Linné. Pl. I, fig. 1.

1758. *Dentalium elephantinum* Linné, Syst. Nat. (10), p. 785.
1766. *Dentalium elephantinum* Linné, Syst. Nat. (12), p. 1263.
1788. *Dentalium elephantinum* Linné. GMEL. Syst. Nat. (13), p. 3736.
1801. *Dentalium elephantinum* Linné. LAM., Syst. An. s. Vert. p. 326.
1818. *Dentalium elephantinum* Linné. LAM., Syst. An. s. Vert. p. 343.
1818. *Dentalium elephantinum* Linné. WOOD, Index Testac., p. 183, N° 2.
1860. *Dentalium elephantinum* Linné. SOWERBY, Thes. Conch. III, p. 102, pl. 223, fig. 4.

1) Species marked with an asterisk have not been obtained by the Siboga.

1872. *Dentalium elephantinum* Linné. REEVE, Conch. Icon. XVIII, pl. 1, fig. 5.
? *Dentalium elephantinum* Linné. CHENU, Illustr. Conchyl. pl. 1, fig. 4—10.
? *Dentalium elephantinum* Linné. HANLEY, The shells of Linnaeus, p. 435.
? *Dentalium elephantinum* Linné. SOWERBY, The Genera of Shells, Zool. Journ. IV, p. 196, Dentalium fig. 1.
1897. *Dentalium elephantinum* Linné. PILSBRY & SHARP, Man. of Conch. vol. XVII, p. 1, pl. 1, figs 1—7.
Not *Dentalium elephantinum* Brocchi, Conch. Foss. Subapp. II, p. 260 (1814).
Not *Dentalium elephantinum* Philippi, Enum. Moll. Sicil., I, p. 245.
Not *Dentalium elephantinum* Deshayes, Mon. genre Dent. (1825).
Not *Dentalium elephantinum* Risso, Hist. Nat. Prodr. Eur. merid. IV, p. 399, 1826.
Dentalium arcuatum Gmel., Syst. Nat. (13), p. 3738 (1788).
Dentalium arcuatum Gmel., ANTON, Verzeichniss d. Conchylien, p. 25 (1839).
? *Dentalium elephantium* Born, Mus. Caes. Vindob, p. 431.
Dentalium recurvum Deshayes (by error?) Mon. Dent. p. 30.
Dentalium striatum (in part) Born, l. c. p. 431.

Diagnosis. Shell robust, the greatest diameter somewhat less than one-sixth the length, solid, strongly curved; dark green, fading to white at the anal opening. Sculpture, about 10 (9—11) strong, projecting rounded longitudinal ribs, narrower than their intervals, which are concave, with one or several weak, low riblets; growth striae delicate, inconspicuous. Aperture sub-circular, scarcely oblique, modified by the ribs, especially on the concave side; anal orifice circular, its edge excavated within and slightly notched excentrically on the convex side. Length 70, diam. at aperture 11,5 × 11 mill., height of arch above chord 15,5 mill. (P. & SH.).

Fig. 2.
Anterior aperture of *D. elephantinum*.

Distribution. Amboyna (RUMPHIUS); Philippine Isl.; Molluccas; Red Sea (ISSEL).

Remarks. This well known species of probably no unfrequent occurrence on the shores of the East Indian Archipelago was not obtained by the Siboga Expedition. It is represented in the collection of the Zoological Museum of Amsterdam by twelve fine specimens of which eight have 10, two have 9 and two have 11 ribs of these five have the apex excentrically notched either to the right or to the left. Of the remaining seven, four have perfectly round apertures (of which two are relatively young individuals) while three have a slight supplemental tube. In one specimen it forms a slight rim along the notched aperture as in *D. entalis*, in the other two the projecting pipe, though short is round and the notch is only formed by the outer layer of the shell.

Length of the longest individual 90, diameter at aperture 10 mill. All from the Molluccas.

*2. *Dentalium formosum* Adams & Reeve. Pl. I, fig. 2.

1848. *Dentalium formosum* Adams & Reeve, Zool. H. M. S. Samarang. Moll. p. 71, pl. 5, fig. 1*a, b*.
1860. *Dentalium formosum* Adams & Reeve. SOWERBY, Thes. Conch. III, p. 102, pl. 223, fig. 2.
1872. *Dentalium formosum* Adams & Reeve, Conch. Icon. XVIII, pl. 2, fig. 7.
1897. *Dentalium formosum* Adams & Reeve. PILSBRY & SHARP. Man. of Conch. vol. XVII, p. 2, pl. 1, figs 9—11.

Diagnosis. Shell robust, solid, cylindric, moderately curved. Sculpture of 13—16

strong rounded longitudinal ribs, becoming broader and flatter toward the anterior aperture and separated by intervals as wide or nearly as wide as the ribs. Ribs as well as intervals microscopically reticulated by fine longitudinal and transverse raised lines, specially visible in young shells and slightly roughening the shell's surface. Peristome a little dorso-ventrally compressed rather thin-edged, undulated by the ribs; ribs interiorly hollow and strongest on the concave margin. Colour very beautifully variegated with rose, olive-green and white. Length 60, dorso-ventral diam. 11, transverse diam. 12, diam. of apex 3,5—4 mill. Perforation of apex beginning as a wide notch and continuing as a slit, with a variable length of 1—4 mill.

(From specimens in the Brit. Mus.).

Distribution. Sooloo Archipelago, outside a coral reef near the city of Sooloo in about 16—20 fms sandy mud. (ADAMS).

3. *Dentalium aprinum* Linné. Pl. I, fig. 3. Pl. IV, fig. 2.

1766. *Dentalium aprinum* Linné, Syst. Nat. (12), p. 1263.
1788. *Dentalium aprinum* Linné. GMEL., Syst. Nat. (13), p. 3736.
1818. *Dentalium aprinum* Linné. LAMARCK, An. s. Vert. V, p. 343.
1825. *Dentalium aprinum* Linné. DESHAYES, Mém. Soc. Hist. Nat. Paris, VII, p. 351, pl. 16, fig. 18.
1860. *Dentalium aprinum* Linné. SOWERBY, Thes. Conch. III, p. 102, pl. 223, fig. 5, 6.
1872. *Dentalium aprinum* Linné, Conch. Icon. XVIII, pl 1, fig. 2*a*, *b*.
? *Dentalium aprinum* Linné. CHENU, Illustr. Conch. p. 2, pl. 1, fig. 11, 12.
1897. *Dentalium aprinum* Linné. PILSBRY & SHARP, Man. of Conch. vol. XVII, p. 3, pl. 1, figs 8, 12, 14.
1839. *Dentalium caprinum* Anton, Verzeichniss d. Conchylien, p. 25 (1839).
1788. *Dentalium striatulum* Gmel., Syst. Nat. (13), p. 3738.
1818. *Dentalium striatulum* Gmel. WOOD, Index test. p. 84, n^0 4.
? *Dentalium striatum* (in part) Born, Test. Mus. Caes. Vindob. p. 431.
Not *Dentalium aprinum* Risso, Hist. Nat. Eur. Merid. IV, p. 399 (1826).
Not *Dentalium aprinum* Brocchi, Conch. Foss. Subappen. II, p. 264 (1814).
Not *Dentalium aprinum* Costa, Fauna Reg. Nap., p. 34, 1850) or other authors on Italian mollusks.

Stat. 33. Bay of Pidjot, Lombok. 22 Metres and less. Mud, coral and coralsand. 1 Spec.
Stat. 64. Djampeah. Up to 32 Metres. Coral, coralsand. 1 Spec.
Stat. 71. Makassar and surroundings. 24—28 Metres. Mud, sand with mud, coral. 5 Spec. juv.
Stat. 313. East of Dangar Besar, Saleh-bay. Up to 36 Metres. Sand, coral and mud. 1 Spec.

Diagnosis. Shell long, slender and well curved, the diameter about one twelfth the length; solid, glossy, pale green, usually somewhat lighter toward the anal end. Sculpture, 9—12 conspicuous but narrow rounded longitudinal ribs, separated by much wider, flat, polished intervals, often parted by a faint median riblet, and usually showing numerous very slight longitudinal striae; the ribs stronger on the concave side; growth striae inconspicuous. Aperture circular; anal orifice very small and circular, its edge crenated by the ribs; no slit. Length 70, greatest diameter 6 mill.

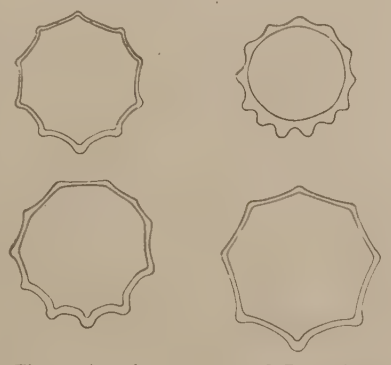


Fig. 3. Anterior apertures of *D. aprinum*.

Distribution. Philippines, Molluccas.

Remarks. A beautiful specimen was obtained at Stat. 33, with all the characteristics of a typical *D. aprinum*. Length 85, greatest diameter 6 mill. Anal orifice with a very slight notch.

The specimen of Stat. 313 is strongly curved like the one figured in SOWERBY's Thes. Conch. III, fig. 5; here the anal orifice is circular.

The specimens from Makassar and Djampeah are very much alike. I hold them for young individuals. They measure 45 mill. and less and are characterised by being fragile, strongly curved, and much attenuated. I hesitated at first before identifying them with the full-grown solid specimens from the Zoological Museum of Amsterdam. Fig. 3 shows the anterior apertures of some of the Siboga specimens. They show the same characters as a typical *D. aprinum*: on the concave side the ribs are stronger and the intervals more concave than on the convex side. This is characteristic for all the species, included in this group.

Var. *incolor* n. v. Pl. IV, figs 3, 4, 5, 6.

Stat. 133. Anchorage off Lirung, Salibabu-island. Mud and hard sand. 4 Spec.
Stat. 163. Anchorage near Seget, West-entrance Selee (Galewo) strait. Sand and stone, mixed with mud. 1 Spec.

Fig. 4. Anterior aperture of *D. aprinum* var. *incolor* with 18 ribs.

Fig. 5. Anterior aperture of *D. aprinum* var. *incolor* of Stat. 133.

Fig. 6. Anterior aperture of *D. aprinum* var. *incolor* of Stat. 163.

Under this variety I include the specimens of Stat. 133 and 163. The specimens of Stat. 133 can easily be recognised as belonging to *D. aprinum*. They only differ by their absolute lack of the green colour which characterises that species. Near the apex the shell is yellow, fading to ivory white near the anterior aperture, but of 4 specimens (none of them quite fullgrown) one has 11, two have 12, one has 18 ribs. The latter number may be an abnormal one, but there is little doubt about identifying that specimen with the others of the same station. (Pl. IV, fig. 3).

The single specimen of Stat. 163 (Pl. IV, fig. 6) has a more doubtful character. It also lacks the green colour of *D. aprinum* but is moreover straighter and by its lusterless appearance looks rather like *D. javanum*. There are however 12 ribs, stronger on the concave side than on the convex side, which fact reminds of *D. aprinum*, and indicates a nearer relationship to that species. In the collection of the British Museum I also found some specimens of this variety; they were labelled *D. aprinum* var. and included forms resembling specimens of Stat. 133 as well as of Stat. 163.

4. *Dentalium interstriatum* Sowerby. Pl. I, fig. 4. Pl. IV, fig. 1.

1860. *Dentalium interstriatum* Sowerby, Thes. Conch. III, p. 102, pl. 223, fig. 7.
1872. *Dentalium interstriatum* Sowerby, Conch. Icon. XVIII, pl. 2, fig. 10.
1897. *Dentalium interstriatum* Sowerby. PILSBRY & SHARP, Man. of Conch. vol. XVII, p. 4, pl. 1, fig. 15.

Stat. 240. Banda. From 9—45 Metres. Black sand. Coral. 15 Spec.

Diagnosis. Shell long, slender and well curved, the greatest diameter from about one twelfth to one seventeenth the length. Sculpture: at and near the apex 8 to 9 narrow ribs; a little lower, at a distance of about 10—15 mill. from the apex, secondary riblets arise, making a total number of 16 to 18 equal rounded longitudinal ribs. Anteriorly the sculpture of different specimens is subject to a great variability. In some specimens the 16 or 18 riblets remain consistent toward the anterior aperture, the intervals either smooth or irregularly striate with small tertiary riblets, in others the secondary riblets become more or less obsolete, while only the primary ones remain clearly visible toward the end. Sculpture on the concave side stronger than on the convex side. Apex entire or with a slight notch. Anterior aperture circular sometimes faintly laterally compressed. Colour yellowish at the apex, fading to dark green toward the anterior aperture.

Fig. 7. Anterior aperture of *D. interstriatum*.

a. Length 80, greatest diam. 6 mill.
b. Length 65, greatest diam. 5,8 mill.

Distribution. Bohol, Philippines, Amboina, Moluccas.

Remarks. *D. interstriatum* resembles *D. aprinum*, but the sculpture is decidedly different.

There are nine fine specimens in the Zool. Mus. of Amsterdam. All have the apex entire, while of the 15 specimens obtained by the Siboga, two have a very slight notch.

SOWERBY's diagnosis is here given:

"Shell strongly arcuate, green, narrow; primary ribs about 10, with smaller ones in the interstices; apex entire. Resembling *D. aprinum* but with numerous interstitial striae".

Mr. PILSBRY having seen no authentic specimens of this species felt inclined to consider it as a variety of *D. aprinum*. Under the name of *D. Letsonae* he described a new species, which after the description greatly resembles some specimens of *D. interstriatum*. To my great regret I was not in the opportunity of comparing both species, and therefore dare not say whether they can be identified.

*5. *Dentalium Letsonae* Sharp & Pilsbry. Pl. I, fig. 5.

1897. *Dentalium Letsonae* Pilsbry & Sharp, Manual of Conch. vol. XVII, p. 4, pl. 1, fig. 13, pl. 5, figs 66, 67, 68.

Diagnosis. Shell long and slender, the length about 12 times greatest diameter, solid, but rather thin, well and equally curved; pale green, with numerous indistinctly defined darker

zones. Sculpture, 17 longitudinal riblets at the apex, increasing to about 25 at aperture, rather unequal in size and strength, but not conspicuously so, the smaller ones being intercalated irregularly; all the main riblets rather wide and rounded, generally wider than the intervals; the concave side as a whole with stronger sculpture than the convex side; growth striae faint. Aperture slightly compressed laterally, not oblique. Anal orifice shortly ovate, the narrower end toward the convex side; no slit or notch. Length 75, length of aperture 6, breadth 5,5 mill.; diam. of apex 2 mill.; height of arch from chord 13 mill.

Distribution. Island of Bohol, Philippines.

Remarks. Messrs PILSBRY & SHARP add.: "With the color and general shape of *D. aprinum*, this species presents less prominent and many more longitudinal riblets, without trace of the definite arrangement seen in that species. It is not especially related to *aprinum* except being of a green color. The aperture is noteciably compressed from side to side. The figures on pl. 5 [(Pl. I, fig. 5)] represent the sculpture at the apex and aperture, with an outline of the latter".

Compare *D. interstriatum*.

Group of D. HEXAGONUM.

Hexagonal or six-ribbed at and near the apex.

I. The whole shell decidedly hexagonal.
   a. Intervals smooth or only with a few striae . . . . *hexagonum*, *sexcostatum*, *minus*.
   a'. Intervals finely ribbed . . . . . *intercostatum*.

II. Shell hexagonal only at the top.
   a. With secondary riblets, all ribs persistent toward aperture.
      Length ± 45, greatest diam. 4 mill. . . . . *pseudosexagonum*.
      Length ± 20, greatest diam. 2,5 mill. . . . . *porcatum*.
      Length ± 22, greatest diam. 2 mill. . . . . *duodecimcostatum*.
   a'. A few secondary riblets, all ribs vanishing toward aperture. *michelottii*.

*6. *Dentalium hexaganum* Gould. Pl. I, fig. 14. Pl. VI, fig. 1.

1859. *Dentalium hexagonum* Gould, Proc. Bost. Soc. N. H. VII.
? *Dentalium hexagonum* Gould, Otia Conch.
1860. *Dentalium hexagonum* Gould. SOWERBY, Thes. Conch. III.
1872. *Deutalium hexagonum* Gould, Conch. Icon.
1874. *Dentalium hexagonum* Gould. LISCHKE, Jap. Meeres Conch III.
1897. *Dentalium hexagonum* Gould. PILSBRY & SHARP, Manual of Conchology, vol. XVII, p. 18, pl. 2, figs 20, 21 and var. 23, 24.
Not *Dentalium hexagonum* Sowerby.

Diagnosis. Shell white, solid, well-curved, hexagonal (by exception heptagonal) in

section, greatest diameter about one twelfth to one fourteenth the length. Sculpture, six equal, strong, rounded longitudinal ribs, becoming a little broader and flatter toward the aperture and separated by flat or slightly concave interstices. At a distance of about 25 mill. from the apex there appears in the middle of each interval a fine and inconspicuous, interstitial riblet. Lower down, some times two or three or more small riblets are intercalated near the first. Apex entire, hexagonal; anterior aperture hexagonal, the sides flat or nearly so.
Length 50 mill.; greatest diameter 4 mill.

Fig. 8.
Anterior aperture of *D. hexagonum*.

Gould's diagnosis is as follows: Shell long, slender, bony, arcuate, hexagonal with obtuse laterally compressed angles, the interspaces unsculptured; peristome six-angled. Length 55, diam. 4 mill.

Distribution: Hongkong, Singapore, Japan.

This species must not be confused with the West-American *Dentalium neohexagonum* Sharp & Pilsbry, which in many collections goes under the name of *Dentalium hexagonum* Sowerby. *D. neohexagonum* has a length of about 35 mill., with a greatest diam. of 2,5 mill., and sculptured with six strong rounded projecting ribs, losing in prominence on the larger part of the shell, the anterior half being rounded or only faintly hexagonal.

Var. *sexcostatum* Sowerby. Pl. VI, fig. 2.

1860. *Dentalium sexcostatum* Sowerby, Thes. Conch. III, p. 103, pl. 223, fig. 11.
1872. *Dentalium sexcostatum* Sowerby, Conch. Icon. pl. 2, fig. 11.
1875. *Dentalium sexcostatum* Sowerby. E. A. Smith, Ann. Mag. N. H. (5) XVI, p. 113.
1897. *Dentalium hexagonum* var. *sexcostatum* Sowerby. Pilsbry & Sharp, Manual of Conch. vol. XVII, p. 19, pl. 2, figs 27, 28.

Diagnosis. Shell slender, its smaller half well curved, larger half nearly straight; white, sculpture of 6 very strongly projecting rounded ribs about half as wide as their interstices; the latter on the smaller third of the shell concave and plain, beyond that, one or two interstitial threads appear in each interval on the convex side, and later in those on the concave side; these increasing in number until near the aperture there are 3—6 unequal threads on the flat ground of each interval. Aperture hexagonal, the angles more or less projecting. Anal orifice a minute ovate foramen, excentric in position on the star shaped apex; no slit or notch. Length 62, breadth and length of aperture 5 mill.

Fig. 9.
Anterior aperture of *D. hexagonum* var. *sexcostatum*.

Distribution. Japan, Cape Shima, 18 fms; Goza harbor, 6 fms (St. John); China (Sowerby).

Remarks. This differs from typical *hexagonum* in the more sculptured intervals, thicker ribs and larger size, but we have little doubt that the forms intergrade (Pilsbry & Sharp).

No specimens were obtained by the Siboga Expedition.

7. *Dentalium minus* n. sp. Pl. VI, fig. 3.

Stat. 319. 6° 16'.5 S., 114° 37' E. Java Sea. 82 Metres. Fine, yellowish grey mud. 2 Spec.

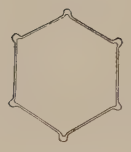


Fig. 10. Anterior aperture of *D. minus*.

Diagnosis. A markedly hexagonal shell, the ribs standing out like fine marginating rods. Interstices flat, smooth with slight irregular growth-striae only; no longitudinal sculpture, except the ribs. Shell substance rather fragile. Anal orifice without notch or slit. Apex and anterior aperture hexagonal. Colour yellowish-white:

a. Length 33 mill., diameter of aperture 2,3 mill.

b. Length 25 mill., diameter of aperture 2,1 mill.

Remarks. This elegant little hexagonal shell is smaller and more slender than *D. hexagonum*. It has the size and curvature of the West-American *D. neohexagonum*, but it is easily distinguished by its fine marginating ribs, losing nothing in distinctness toward the anterior aperture.

D. Picteti, a hexagonal shell of doubtful West-Indian locality cannot be identified with our species. DESHAYES in his description mentions that the interstices are alternately marked with translucent and opaque white, while the posterior orifice is somewhat bi-labiate, two facts which prove that the forms are distinct.

8. *Dentalium intercostatum* n. sp. Pl. VI, fig. 4.

Stat. 178. 2° 40' S., 128° 37'.5 E. Ceram Sea. 835 Metres. Blue mud. 1 Spec.
Stat. 314. 7° 36' S., 117° 30'.8 E. Flores Sea. 694 Metres. Fine sandy mud. 2 Spec.

Fig. 11. Anterior aperture of *D. intercostatum*.

Diagnosis. Shell strongly curved at the top, the rest nearly straight; sculpture of six or seven sharply-edged ribs; the interstices concave and smooth near the apex, but becoming flat toward the anterior aperture, with many longitudinal threadlike riblets; the number of threads in each interval varies between 5 and 8, some times there are some finer ones between. Growth striae clearly visible, crossing the longitudinal threads, fut far less conspicuous than those. Apex entire star-shaped. Anterior aperture hexagonal (or heptagonal), finely crenulated by the riblets, a little jagged from fracture. Colour white or yellowish white:

a. Length 30 mill., greatest diameter 2,7 mill.

b. Length 23 mill., greatest diameter 2,2 mill.

*9. *Dentalium pseudosexagonum* Deshayes. Pl. I, fig. 10.

1825. *Dentalium pseudosexagonum* Deshayes, Mém. Soc. Hist. Nat. Paris, II, p. 358, pl. 16, fig. 14, 15, 16.
1860. *Dentalium pseudosexagonum* Deshayes. SOWERBY, Thes. Conch. III, p. 103, pl. 224, fig. 34.
1872. *Dentalium pseudosexagonum* Deshayes, Conch. Icon.
1877. *Dentalium pseudosexagonum* Deshayes. BRAZIER, Proc. Linn. Soc. N. S. Wales, II, p. 56.
1897. *Dentalium pseudosexagonum* Deshayes. PILSBRY & SHARP, Manual of Conch., vol. XVII, p. 23, pl. 4, figs 47, 48.

Diagnosis. Shell cylindrical, subulate, somewhat curved, grayish-white, somewhat transparent. At the apex there are 6 strongly projecting equidistant angles; between each of these ribs a great many striae arise, covering the shell, and the primary ribs rapidly decrease and disappear at the first fourth or third of the shell's length. Growth striae quite fine and often regular. Length 45—50, greatest diameter 4 mill. (P. & Sh. from Desh.).

Distribution. Masbate, Philippines; W. Columbia (Sowb.); Cape York, near Albany I. North Australia, 11 fms; Darnley I., Torres Straits, 30 fms (Chevert Exp.) (P. & Sh.).

This species is six-ribbed near the apex, finely striated below, as Mr Sowerby expresses it. The specimens before me have very fine threadlike ribs; the number of ribs in all are from 24 to 25, and at or near the apex 6. Shell thin, white, slightly arched (Brazier).

Mssrs Pilsbry and Sharp think it very probable that "W. Columbia", cited by Sowerby as a locality for this species refers to specimens of *D. oerstedii* Mörch from the Panamic Province.

No specimens were obtained by the Siboga Expedition.

*10. *Dentalium duodecimcostatum* Brazier.

1877. *Dentalium duodecimcostatum* Brazier, Proc. Lin. Soc. N. S. Wales II, p. 56.
1897. *Dentalium duodecimcostatum* Brazier. Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 13.

Diagnosis. Shell straight, white, thin, shining, smooth, six-sided, having two longitudinal rounded ribs, one on the edge of each square, from the center between the interstices one fine rib extending to the base, making in all 12 ribs; apex tapering, entire with minute perforation; aperture large. Length 22 mill., diam. of apex 0,5, base 2 mill. (Braz.).

Distribution. Darnley Island, Torres Straits, 30 fms. sandy mud (Chevert Exp.).

Remarks. Brazier adds: Only one specimen found. It differs from anything at present known. The shell is six-sided, the base with twelve ribs, and from the center to the apex six, with the interstices smooth.

*11. *Dentalium porcatum* Gould. Pl. I, fig. 15.

1859. *Dentalium porcatum* Gould, Proc. Bost. Soc. N. H. VII, p. 166.
? *Dentalium porcatum* Gould, Otia Conch.
1872. *Dentalium porcatum* Gould. Sowerby, Conch. XVIII, pl. 7, fig. 47.
1897. *Dentalium porcatum* Gould. Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 15, pl. 6, fig. 80.

Diagnosis. Shell moderately curved, white, more or less ruddy at the apex six-ribbed at apex, secondary riblets appearing first on the convex side, afterwards on the concave side, increasing to 20 at the anterior aperture. Interstices microscopically longitudinally striated. Apex with a short supplemental tube. Length 20, diam. 2,5 mill.

Distribution. Hongkong Harbor, China (N. P. Expl. Exp.) Karachi (Melv. & St.).

12. *Dentalium Michelottii* Hoernes nov. rec. spec. Pl. V, fig. 23, 24.

1856. *Dentalium Michelottii* Hoernes, Foss. Moll. tert. Beck. Wien, p. 654, fig. 84, 85, 86.
1897. *Dentalium Michelottii* Hoernes. SACCO, I Moll. d. terr. terz del Piemonte e della Liguria, Parte XXII, p. 96, Tav. VII, figs. 84, 83, 86.

Stat. 159. 0° 59'.1 S., 129° 48'.8 E. 411 Metres. Coarse sand. 2 Spec.

Diagnosis. Shell long, attenuated, not much curved, white and shining. Hexagonal at the top, anteriorly smooth and rounded. Sculpture of 6 sharp ribs vanishing totally before the shell's second half. None or a very weak interstitial thread appear at some distance from the top in the interstices. Second half of the shell's surface smooth, very brilliant with faint superficial growth striae, perfectly round in section. Apex entire, hexagonal. Anterior aperture rounded, rather oblique.
Length 68 mill.; greatest diameter 3,5 mill.

Distribution. Tertiary Basin of Vienna, Tertiary Strata of Italy.

Remarks. Due to the kindness of Prof. SACCO, of sending over from the Torino Museum a specimen of *D. Michelottii*, I was able to compare the fossil form with the Siboga types. After comparison, little doubt is left, that both forms are identical. HOERNES and MICHELOTTI were the first to distinguish the fossil shell properly. It was known to them from the Basin of Vienna; afterwards many authors have reported it from the tertiary strata of Italy. SACCO describes some specimens from the Tertiary (lower miocene) of Piedmont and Liguria, where it seems to be rather frequent. He distinguishes the following varieties: *intercosticellata*, *rotundulina*, *rotundo-simplex*, *costulatior*, *costulatissima*.

Group of D. KATOWENSE.

Small species, seven-ribbed at apex.

I. Interstices with fine riblets, length 14 mill. 10 times the diam. . . . . *cheverti.*
II. Interstices subdivided by secondary riblets and finely longitudinally striated.
Length 14 mill. 7 times the diam. . . . . *katowense.*

*13. *Dentalium Katowense* Brazier.

1877. *Dentalium Katowense* Brazier, Proc. Linn. Soc. N. S. Wales II, p. 56.
1897. *Dentalium Katowense* Brazier. PILSBRY & SHARP, Man. of Conch. vol. XVII, p. 9.

Diagnosis. Shell white, thin, transparent, slightly arched near the apex; 7-ribbed, from the center to the base 14, those above being most conspicuous; interstices with minute lengthened striae; apex thickened; perforation small, entire; aperture circular. (BRAZIER).
Length 14; diam. of apex 1; base 2 mill.

Distribution. Katow, New Guinea 8 fathoms, sandy mud and coral (Chevert Exp.).

Remarks. BRAZIER adds: A white species with 14 ribs on the base, having 7 at the apex more defined.

*14. *Dentalium Cheverti* Sharp & Pilsbry.

1877. *Dentalium septemcostatum* Braz., Proc. Linn. Soc. N. S. Wales, II, p. 57. (Not *D. septemcostatum* Abich 1859).
1897. *Dentalium Cheverti* Pilsbry & Sharp, Manual of Conch., vol. XVII, p. 9.

Diagnosis. Shell white, slightly arched, 7-ribbed, ribs somewhat sharp, having finer ones between, extending from the base to the center, interstices with fine transverse silk-like striae; apex perforated, perforation with a minute notch-like fissure on the dorsal margin; aperture circular, entire. Length 14, diam. apex 0,5; base 1,5 mill. (P. & Sh. from Braz.).

Distribution. Evans' Bay, Cape York, North Australia. 6 fms sand (Chevert Exp.).

Group of D. OCTANGULATUM.

Octagonal or eight-ribbed at and near the apex.

I. The whole shell decidedly octagonal.
   a. 8—9 strong ribs at the apex, becoming lower and more obtuse toward aperture. Length 50 mill. 10 times the diam. . . . . *octangulatum*.
   a'. 8 strong prominent narrow ribs. Length 50—80 mill. 12 times the diam. *javanum*.
   a''. 8 marginating narrow ribs. Length 45 mill. 15 times the diam. . . *tubiforme*.
II. Shell eight-ribbed only at the top; interstices subdivided by secondary and tertiary riblets.
   Greatest diam. about $^1/_{15}$ the length. . . . . *oryx*, *leucoryx*.
   Greatest diam. about $^1/_9$ the length. . . . . *cancellatum*.

*15. *Dentalium octangulatum* Donovan. Pl. I, fig. 8. Pl. IV, figs 8, 9.

1803. *Dentalium octangulatum* Donovan, Nat. hist. Brit. Shells V, pl. 162 (quoted *octangulum* by Turton.
1818. *Dentalium octogonum* Lamarck, An. s. Vert. V, p. 344.
1819. *Dentalium striatulum* (in part) Turton, Conch. Dict. Brit. Is. p. 352, pl. 16, fig. 5, 6.
? *Dentalium aprinum* Mawe, Linn. Syst. Conch. pl. 33, fig. 1 (not of Linné).
1825. *Dentalium octogonum* Lamarck. Deshayes, Mém. Soc. Hist. Nat. Paris, II, p. 352, pl. 16, figs 5, 6.
1841. *Dentalium octogonum* Lamarck, Delessert Rec. de Coq., pl. 1, fig. 1.
? *Dentalium octogonum* Lamarck. Chenu, Illustr. Conchyl. I, p. 5, pl. 1, fig. 21—23.
1860. *Dentalium octogonum* Lamarck. Sowerby, Thes. Conch. III, p. 102, pl. 223, fig. 9.
1872. *Dentalium octogonum* Lamarck, Conch. Syst. II, pl. 36, fig. 8.
1874. *Dentalium octogonum* Lamarck. Lischke, Jap. Meeres Conch. II, p. 103, III, p. 75, pl. 5, figs 1—3.
? *Dentalium octogonum* Lamarck. Dunker, Index Moll. Mar. Jap., p. 153.
1877. *Dentalium octogonum* Lamarck. Brazier, Proc. Linn. Soc. N. S. Wales II, p. 55.
1878. *Dentalium octagonum* Angas, Proc. Z. S. p. 868.
1897. *Dentalium octangulatum* Donovan. Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 16, pl. 2, figs 16, 17, 18, 22.
Not *D. octagonum* Costa, Fauna Reg. Nap. Dent. p. 19, pl. 1, fig. 6 (1850).

Diagnosis. Shell rather slender, the length about 10 times the greatest diameter, well curved, white or bluish white; nearly lusterless or shining. Sculpture 8 (rarely 9) longitudinal rounded ribs, extremely strong and prominent toward the smaller end, often lower toward the aperture, parted by deep concave intervals, smooth in the young, but usually with several or many unequal longitudinal striae in adult specimens at least toward the larger end; growth-lines slight. Aperture somewhat oblique, octagonal, a trifle longer than wide. Anal orifice minute, a little channelled on the convex side but without a slit.

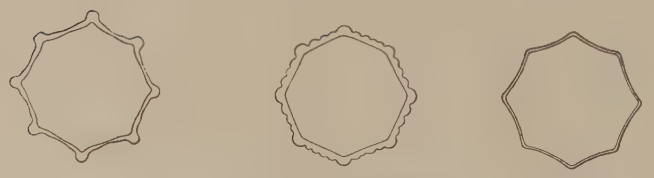


Fig. 12. The anterior apertures of three different specimens of *D. octangulatum*.

Length 50, greatest diam. 5, least 1 mill.
Length 52, greatest diam. 5,3, least 0,8 mill. (P. & Sh.).

Distribution. China Sea (authors); Japan, Nagasaki and Bay of Jeddo (Lischke); Hakodate (Schrenck); Kii coast (Stearns); Ceylon (Tennent); N. Australia at Cape York, Princess Charlotte Bay, Katow, New-Guinea, Darnley Island, Torres Strait (Chevert Exped.); generally distr. from Bushire to Karachi (Melv. & St.).

To this diagnosis Messr Pilsbry and Sharp add: "Out of 32 specimens before us from Japan, 2 have nine equal and equidistant ribs and in another one rib is replaced by two contiguous smaller ones. The young are much more curved than adults; and in the latter the larger half of the length is scarcely arcuate. The number of the ribs is practically the chief character separating this from *D. sexcostatum*.

In some specimens the primary ribs become much lower toward the aperture, which, while still octagonal, has the angles rounded off, not projecting as in the typical form".

No specimens were obtained by the Siboga Expedition.

16. *Dentalium javanum* Sowerby. Pl. I, fig. 6. Pl. IV, fig. 7.

1860. *Dentalium javanum* Sowerby, Thes. Conch. III, p. 102, pl. 223, fig. 12.
1872. *Dentalium javanum* Sowerby, Conch. Icon. XVIII, pl. 3, fig. 14.
1886. *Dentalium javanum* Sowerby. Watson, Chall. Rep., p. 12.
1897. *Dentalium javanum* Sowerby. Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 4, pl. 4, fig. 49.

Stat. 162. Between Loslos and Broken islands, West coast of Salawatti. 18 Metres. Coarse and fine sand with clay and shells. 4 Spec.
Stat. 33. Bay of Pidjot, Lombok. 20 Metres. Coralsand.

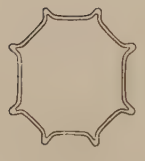


Fig. 13. Anterior aperture of *D. javanum*.

Diagnosis. A large shell, well curved, the length about 10 to 13 times the diameter, tawny and nearly lusterless. Sculpture of eight longitudinal prominent ribs separated by flat or slightly concave intervals. Intervals smooth with slight growth striae only. Aperture rather oblique, dorso-ventral diameter a trifle longer than the transverse diameter. Apex entire, anal orifice rather wide. Peristome thin, the ribs internally excavated, specially on the concave curve.

Length 78 mill., dorso-ventral diameter 6 mill.; transverse diameter 5,5 mill.
Length 82 mill., dorso-ventral diameter 7 mill.; transverse diameter 6,5 mill.

SOWERBY's diagnosis is as follows: Shell strongly arcuate, pale tawny or greenish, angulated by 8 ribs, the interstices wide and flat; apical slit small. Differing from *D. aprinum* in having 8 instead of 10 ribs, with broad flat surfaces between.
Length 77, greatest diam. 7 mill.
Length 48, greatest diam. 3,6 mill.

Distribution. Java, Malacca (SOWB.); Torres Strait; Cape York 3—11 fms; Wednesday Island, 8 fms West of Cape York, south of New Guinea, 28 fms; (Challenger). Karachi (MELV. & ST.).

Remarks. The shell of *D. javanum* is less solid than of *D. octangulatum*. It is more slender, longer and the ribs are narrower and more raised than in *octangulatum*.

Dentalium filosum Broderip & Sowerby (1830—32, Zool. Journ. V, p. 48) is probably an extinct name for what may have been *D. javanum*. Here follows the diagnosis:

"Shell slender, thin, white; with 8 longitudinal threads, and very close transverse striae. Length 65, diam. 5 mill. Tenasserim on shore. Distinguished from *D. octogonum* by its much more slender shape and its thinner shell. Instead of the eight angles of that species it has eight distinct raised longitudinal threads. Three specimens of this fine species were lately brought to England by Mr HAY, who himself picked them up on the coast of Tenasserim".

This insufficient description without figure makes it impossible to identify the form with certainty. The type is not in the British Museum.

17. *Dentalium tubiforme* n. sp. Pl. VI, fig. 5.

Stat. 159. 0° 59'.1 S., 129° 48'.8 E. 411 Metres. Coarse sand. 1 Spec.
Stat. 212. 5° 54'.5 S., 120° 19'.2 E. 462 Metres. Fine grey and green mud. 1 Spec.

Diagnosis. Shell well curved, tapering in the young individual, but in the older specimen keeping nearly the same diameter over the longest part of the shell. Eight-ribbed, the ribs sharply cut at the top, anteriorly rounded, but very narrow, standing out like marginating rods. Beautifully transversely striated the striae cancellating the ribs, so that it can be felt by rubbing one's nail over the ribs. Interspaces deeply concave at the top, flat toward the anterior aperture, with some inconspicuous longitudinal threads, giving together with the transverse striae a reticulated appearance to the shell's surface (seen under a lens). In both specimens obtained by the Siboga, the apex is broken in rather a peculiar way. Over a small distance the ventral wall has disappeared and only the thick-walled dorsal side remains visible. Probably the apex in perfect specimens is simple, with a thickened dorsal wall and a very thin ventral wall. Peristome octagonal, the sides flat, the angles faintly raised.
a. Length 45 mill., greatest diam. 3 mill.
b. Length 25 mill., greatest diam. 2 mill. (young).

Colour white or with a dark brown deposit at the anterior end.

Remarks. In the older specimen the sculpture is not so clearly visible as in the younger one. The chalky and dark brown deposit in the oldest specimen renders the cancellated character less striking, even quite invisible on some parts. Both specimens show an extremely deep circular incision where a broken peristome has been repaired.

D. tubiforme is much finer cancellated than *D. cancellatum* and there are no secondary riblets as in that species.

*18. *Dentalium cancellatum* Sowerby. Pl. I, fig. 16.

1860. *Dentalium cancellatum* Sowerby, Thes. Conch. III, p. 101, pl. 224, fig. 36.
1872. *Dentalium cancellatum* Sowerby, Conch. Icon. XVIII, pl. 5, fig. 29.
1897. *Dentalium cancellatum* Sowerby. PILSBRY & SHARP, Man. of Conch., vol. XVII, p. 30, pl. 10, fig. 67.

Diagnosis. Shell thin, white, acuminate, strongly curved towards the apex, where it is cancellated by about 8 longitudinal ribs and elevated concentric striae, then the shell becoming straighter and the ribs more numerous (SOWB.).
Length $25^1/_2$, greatest diam. 3 mill. (P. & S. from fig.).

Distribution. China Sea.

19. *Dentalium oryx* n. sp. Pl. VI, fig. 24.

Stat. 302. 10° 27'.9 S., 123° 28'.7 E. 216 Metres. Sand and coral sand. 5 Spec.

Diagnosis. Shell straight or only with a faint curve at the top. Sculpture of 8 narrow riblets at the apex, increasing to double that number by intercalation of secundary riblets and doubling again that number by renewed intercalation of tertiary riblets. Interstices faintly concave, without longitudinal or transverse sculpture. Ribs persistent toward the anterior aperture, their profile irregularly undulated.

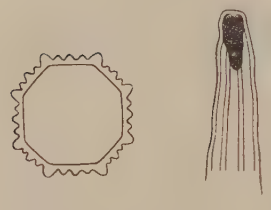


Fig. 14. Anterior aperture and apex of *D. oryx*.

Anal orifice with a short wide incision. Anterior aperture distinctly octagonal, not oblique. Colour white or bluish white, a little transparent.

a. Length 26 mill., greatest diam. 2 mill.
b. Length 20 mill., greatest diam. 1,8 mill.
c. Length 27 mill., greatest diam. 2,2 mill.

20. *Dentalium leucoryx* n. sp. Pl. VI, fig. 23.

Stat. 285. 8° 39'.1 S., 127° 4'.4 E. 34 Metres. On the limit between mud and coral. 3 Spec.

Fig. 15. Anterior aperture and apex of *D. leucoryx*.

Diagnosis. Shell moderately curved, white, shining and transparent in young individual. Sculpture of eigth narrow rounded riblets at the apex, soon increasing to double that number by intercalation. Ribs persistent toward aperture in the youngest individuals, becoming a little obsolete in the older individual. The profile of the ribs is irregularly undulated, due to

irregular growth. They are cancellated near the top, but so little that it is hardly discernable through a strong lens. Interstices at the top very finely transversely striated, becoming anteriorly smooth and brilliant with growth striae only and a few indistinct longitudinal threads. In the longest individual the peristome was often broken as it seems and each time the fracture was repaired in such a way that the ribs in their continuation alternate with the intervals.

Apex without slit or notch, octagonal; anterior aperture circular, not oblique.

a. Length 29 mill., greatest diam. 2 mill.
b. Length 33 mill., greatest diam. 2 mill.
c. Length 37 mill., greatest diam. 2,3 mill.

Remarks. In outward appearance *D. oryx* and *D. leucoryx* strongly resemble each other. Both species are slender, much attenuated, and show the same irregularity of growth. It is moreover possible that in older specimen of *D. leucoryx* tertiary riblets yet might appear. The difference lies in *D. oryx* being straighter than *D. leucoryx* and having a distinctly octagonal anterior aperture.

Group of D. BISEXANGULATUM.

Six to fourteen ribbed at and near the apex.

I. Six to twelve ribs at and near apex; the ribs sometimes longitudinally splitting. Length ± 30 mill. 8 or 9 times the diam. . . . . *intercalatum.*

II. Nine to eleven ribs at and near apex; the ribs sometimes longitudinally bisected. Length 30—50 mill. about 8 times the diam. . . . . *macandrewi.*

III. Nine ribs at and near apex.
a. Interstices with secondary riblets. Length 33 mill., about 13 times the greatest diam. . . . . *sinuosum.*
a'. Interstices smooth. Length 20 mill. greatest diam. about 2,5 mill. . *robustum.*

IV. Eight to ten ribs, becoming obsolete toward aperture.
a. Length 50, greatest diam. 4 mill. . . . . *lessoni.*
a'. Lenght 60, greatest diam. 3,5 mill. . . . . *pluricostatum.*

V. Ten ribs at and near the apex.
Interstices flat, finely transversely striated. Length 20, greatest diam. 2,5 mill. *decemcostatum.*
Interstices concave, finely ribbed. Length about 14 mill., greatest diam. 1,7 mill. (sometimes eight-ribbed). . . . . *tasmaniense.*

VI. Eleven to thirteen ribs; interstices with a weak thread or none. Length 70, greatest diam. ± 6 mill. . . . . *bisexangulatum.*

VII. Eight to fourteen ribs.
a. 14 ribs near apex. Length 31 mill. greatest diam. 1,6 mill. . . . *cookei.*
a'. 8—14 ribs at apex, intercalation of secondary riblets. Length ± 15 mill. greatest diam. 2 mill. . . . . *paucicontortum.*

*21. *Dentalium bisexangulatum* Sowerby. Pl. I, fig. 7.

1860. *Dentalium bisexangulatum* Sowerby, Thes. Conch. III, p. 102, pl. 223, fig. 8.
1872. *Dentalium bisexangulatum* Sowerby, Conch. Icon. XVIII, pl. 3, fig. 14.
1877. *Dentalium bisexangulatum* Sowerby. BRAZIER, Proc. Linn. Soc. N. S. Wales II, p. 57.
1879. *Dentalium bisexangulatum* Sowerby. VON MARTENS, Monatsber. Preuss. Akad. Wiss. Berlin, p. 739.
1885. *Dentalium bisexangulatum* Sowerby. COOKE, Ann. Mag. N. H. (5), XVI, p. 273.
1897. *Dentalium bisexangulatum* Sowerby. PILSBRY & SHARP, Man. of Conch., vol. XVII, p. 15, pl. 2, fig. 25.

Diagnosis. Shell well curved, solid, moderately stout, the length about 11 or 12 times the greatest diameter; white. Sculpture of about 12 (11 to 13) strong longitudinal narrow ribs, about a third as wide as the concave intervals, which are ribless or show a weak median thread on the convex side (or occasionally all the intervals except one or several on the concave side have low median threads); growth-striae fine and superficial. Aperture a trifle compressed laterally, strongly angulated by the projecting ribs on the concave margin. Anal orifice rounded, with a wide, shallow notch on the convex side.
Length 68, length of aperture 6,5, breadth 6 mill; height of arch from chord 10 mill.
Length 72, length of aperture 6,2, breadth 6 mill; height of arch from chord 11,5 mill. (P. & SH.).

Distribution. Java (SOWERBY); Singapore (ARCHER); Yokohama, Japan (LOOMIS); Gulf of Suez (MAC-ANDREW); Torres Straits and Vicinity, 8—30 fms (Chevert Exp.); Querimba Isl. and Mozambique (PETERS coll.).

Remarks. No specimens were obtained by the Siboga. PILSBRY states that there are oftener 11 than 12 ribs, and that the development of an intermediate thread in each space over the greater part of the shell is occasional though probably exceptional.

*22. *Dentalium intercalatum* Gould. Pl. I, fig. 9.

1859. *Dentalium intercalatum* Gould, Proc. Bost. Soc. Nat. hist. VII, p. 166.
? *Dentalium intercalatum* Gould, Otio Conch.
1872. *Dentalium intercalatum* Gould. SOWERBY, Conch. Icon. XVIII, pl. 7, fig. 45.
1897. *Dentalium intercalatum* Gould. PILSBRY & SHARP, Man. of Conch., vol. XVII, p. 23, pl. 11, figs 88, 89.
1904. *Dentalium intercalatum* Gould. JOS. C. VERCO. Notes on South-Austr. Moll. Trans. Proc. Rep. Roy. Soc. S. A., vol. XXVIII, p. 135—138, pl. XXVI (fig. of radula).
1897. *Dentalium Bednalli* Pilsbry & Sharp, Man. of Conch. vol. XVII, p. 248, pl. 39, figs 1, 2, 3.
1878. *Dentalium octagonum* Angas (non Lam.), P. Z. S. p. 868, Henley Beach S. A.
? 1893. *Dentalium octogonum* Adcock's Hand List of the Aquatic Mollusca inhabiting South-Austr. p. 10.

It is practically impossible to give one clear diagnosis for this exceedingly variable species. Here follows first the diagnosis of *D. intercalatum* Gould, being taken after a young specimen, then of *D. bednalli* P. & Sh. being a description of an old specimen of *intercalatum* under a new name.

Diagnosis of a young specimen. Shell strongly curved and conspicuously tapering in its earlier half, the later half nearly straight and less tapering; white, lusterless. At and near

the apex hexagonal in section, the angles rather sharp and a little projecting, intervals nearly flat. Not far from the apex a secondary riblet arises in each of the two faces on the outer curve, and somewhat later the lateral faces and those on the concave side are similarly divided; the secondary riblets gaining rapidly in strength, and on the latter part of the shell equal to the six primary ribs. Toward the aperture there are 12 equal, equidistant ribs, rounded but well projecting, and about half as wide as the concave, excavated intervals, which are smooth except for light growth striae. Aperture circular, the outer edge of peristome scalloped by the ribs. Apical orifice circular, about half as wide as the truncated apex. Length 19, diam. at aperture 2,25, at apex 0,9 mill.

Diagnosis of an older specimen. Shell soiled or Isabella-whitish, moderately arcuate, the curvature mainly posterior. Sculpture: at and near the apex with 7 strong, rounded ribs separated by deeply concave and decidedly wider intervals; passing anteriorly the ribs become lower and wider, and tend to split by the appearance of progressively deepening sulci on their side slopes, so that at the aperture there are about 10 very low ribs of unequal prominence, besides some incipient ones; the intervals shallow and narrower than the ribs. Growth striae fine and rather inconspicuous throughout, no longitudinal striation. Aperture subcircular retaining a slightly hexagonal form, as long as wide; apex rather large, the orifice small, oval, longer than wide, with thick walls; no slit or notch. Length 19, diam. at aperture 2,8, at apex 1,3 mill.

Distribution. China Seas (North Pacif. Expl. Exp.); St. Vincent and Spencer Gulfs, Investigator Strait, and Backstairs Passage (Verco).

Remarks. Mr. Jos. C. Verco has published the following interesting note on this species:

"Angas misidentified our shell from Henley Beach as *D. octogonum* Lam., and cited it as a South Australian shell in P. Z. S., 1878, p. 868. Pilsbry & Sharp, in Tryon's Man. of Conch., vol. XVII, p. 248, described a shell under the name of *D. Bednalli*, from St. Vincent Gulf, sent to them by Mr W. T. Bednall. This name would stand, were it not that specimens of our extremely variable species are inseparable from *D. intercalatum* Gould, 1859, which has priority.

I have examined more than three hundred individuals, dredged by me in St. Vincent and Spencer Gulfs, Investigator Strait, and Backstairs Passage. They have been taken alive at all depths between eight and twenty-two fathoms, chiefly in muddy bottoms. I have vainly endeavoured to discover more than one species among them. They are exceedingly variable, and were it not for intermediate forms, quite a dozen species might be created.

Its length varies of course: firstly, with its age; individuals when very young are only 5 millimetres, when senile 37; secondly, with the amount of its posterior end which has been removed, so that a stouter, older shell may not be so long as another which is evidently younger and has not suffered so much truncation.

Its curvature is also very variable. In its early stage of growth it is well curved, but becomes gradually, though markedly, less so as it gets older. Since the posterior end is progres-

sively removed, the mature shell has an appearance quite different from that of the immature, being nearly straight and bluntly truncated, instead of well curved and posteriorly acuminate.

The same individual in its two extreme stages of growth, without the controlling intermediate examples, might be excusably described as distinct species. This probably partly explains why the name of *D. Bednalli* Pilsbry & Sharp, has been added to that of *D. intercalatum* Gould, the former being an old individual, and the latter a young one.

One shell, compared in the Natural History Museum, London, with that labelled *D. intercalatum* Gould, was identical, and represents our immature, curved, sharp-pointed stage. The figure given in TRYON's Man. of Conch. corresponds with it, as does also the description there transcribed, even to the origin of its secondary riblets, first in the two interspaces on the outer curve, and somewhat later in the lateral ones and on the concave side, as italicised in the manual. Hence, though the type locality of this species is given as China Seas, the identity of our South Australian form is indisputable.

The number of ribs very rarely remains the same throughout the entire of the shell; thus one with eleven rather acute ribs at the posterior end has but eleven at the anterior. Almost always the ribs become more numerous with age. The increase is effected in two ways, by intercalation and by rib splitting.

1. By intercalation. Generally in the centre of an interspace a riblet arises, and gradually enlarges until it equals the original ribs. The stage of growth at which this begins is variable, not only in different shells, but in the several interspaces of the same shell. For instance, when the individual is quite immature every interspace may bear a riblet, whereas when senile there may be only the first indication of one. Again, one interspace may show a riblet very soon, and later, other interspaces may develop them at varying distances as in the typical *D. intercalatum*. Besides these secondary riblets, eventually tertiary riblets may arise in their interspaces and further multiply the costations. Still another variation is to be seen — instead of a single secondary costula arising in an interspace, two riblets of equal dimensions may develop simultaneously. This twin intercalation alone may be found in an example, or there may be every combination of single and of double intercalation.

2. By rib-splitting. A groove begins to form in a rib, and gradually grows in depth and width until it divides it into two. This groove may begin on the centre or on any part of the side of the rib. The ribs so formed may subsequently be cut up by other grooves. Sometimes two or three of such furrows may appear on the same rib at the same time and enlarging at an equal rate form three or four subequal riblets.

The two methods, intercalation and rib-splitting, may occur alone in respective individuals, or both in the same example, and there may be any conceivable ratio between the two methods in different specimens.

The contour of the ribs may vary greatly. They may be at their inception narrow and comparatively high, and may so continue throughout their length. Or after some increase in size they may begin to decline in height until they almost fade out and leave the anterior part of the shell nearly smooth. Their shape may completely change; whereas at first, they may have concave interstices so as to resemble a fluted column, the ribs may widen out and become

convex, while their interstices become reduced to narrow, shallow grooves between broad, approximate, rounded ribs.

The number of ribs at the posterior end is very variable. If multiplication of costæ occurs, it is plain that the older the shell and the more truncated, the greater will be the number of ribs at the posterior extremity; and if such multiplication always began at the same stage of growth and was equally rapid, the number would always be greater with a greater truncation. But such is not the case, hence the number of ribs at the hinder end varies widely. Six is the fewest I have found. But there may be any number beyond this up to fourteen, which is the most yet observed. These larger numbers are by no means restricted to examples with much truncation, nor is there any definite proportion between the number of ribs and the diameter of the shell; some of large diameter at the truncation have but few, and vice versa. A diagnosis framed upon the number of ribs would be baseless. PILSBRY suggests the typical form is hexagonal; probably he is right, but usually there are more than six costæ.

The anal appendical tube is wanting in most cases, even during life. When present it may be two or three millimetres long. It may exist when the shell is young and narrow, and be wanting when old and wide; possibly it may have been broken off. It is central and most frequently in the axis of the shell. But it may be distinctly out of the axis, joined at an angle so as to point markedly towards the concave side, or slightly towards the convex, and in one it is funnel-shaped instead of cylindrical. These circumstances confirm the suggestion of its being an outgrowth subsequent to truncation, and not merely a residual inner layer of the shell after the outer portion has been absorbed.

The radula (pl. XXVI, figs 14*a*, *b*, *c*, *d*) is comparatively large, and contains fifteen rows of teeth, with the formula 1 . 1 : 1 . 1 . 1. The rachidian tooth is about twice as wide as high, is thickened along its free edge, and thinned along its attached border. The single lateral is stout and rather short, and has one obliquely placed cusp without serrations. The marginals are trapezoidal flat plates, thickened along their inner end, and the whole or larger part of their upper margin. Mr KESTEVEN, in executing the drawings, detected a small accessory plate of chitin (fig. 14*d*). It is somewhat pyriform, stouter at its narrow, attached end, and thinner and slightly striate at its free, expanded extremity. Its height is about one-half that of the rachidian tooth, outside of which it stands, with its base about half-way between this and the lateral. As the laterals overlap the outer fourth or third of the rachidian, this plate lies behind or between the laterals, and being comparatively thin it cannot be seen through the much denser laterals; but in a dismembered radula it can be certainly recognised.

*23. *Dentalium macandrewi* n. n. Pl. V, figs 25—34.

1885. *Dentalium lineolatum* Cooke, Ann. Mag. Nat. Hist. (5), XVI, p. 274.
1885. *Dentalium aratorum* Cooke, Ann. Mag. Nat. Hist. (5), XVI, p. 274—275.
1885. *Dentalium clavus* Cooke, Ann. Mag. Nat. Hist. (5), XVI, p. 275.
1897. *D. lineolatum* Cooke, *aratorum* Cooke, *clavus* Cooke. PILSBRY & SHARP, Man. of Conch., vol. XVII, p. 10, p. 11 and p. 55.
? *Dentalium reevii* Desh. MSS. MAC-ANDREW in collection.
? 1871. *Dentalium reevei* Desh. MSS. FISCHER, Journ. de Conchyl. XIX [(3), XI], p. 212.
? 1894. *Dentalium laugieri* Jousseaume, Bull. Soc. Philom. de Paris VI, p. 103.

Diagnosis. Shell solid, pale amber coloured or whitish, acuminate in young, strongly truncated in adults. Sculptured with nine to twelve strong equidistant ribs which are generally bisected by a longitudinal groove. Interstices twice as wide as the ribs sculptured with 3—4 slightly raised riblets and decussated (especially near the apex) by extremely minute transverse lines. Apex generally slightly notched on the convex side and internally lined with a small rim or a short supplemental tube. Anterior aperture not oblique.

a. Length of young attenuated specimen 18, diam. of aperture 3,2, diam. of apex 0,6 mill.

b. Length of older specimen 35, diam. of aperture 4 of apex 2,3 mill.

c. Length 42, diam. of aperture 5 of apex 1,8 mill.

d. Length 50, diam. of aperture 6,5 of apex 22 mill.

Distribution. Gulf of Suez.

Remarks. This species strongly resembles *D. Belcheri* Sowerby. Some of the younger specimens are faintly maculated on the ribs, and the resemblance is then greater still. It differs however in having the ribs longitudinally bisected and by the close transverse striation near the apex.

The description and the figures are made after specimens in the Mac-Andrew collection of Cambridge. Mr. Cooke distinguished them into three species, but after having carefully examined all the specimens referring to his species I have come to the conclusion that they all belong to the same specific form. Probably he was deceived by the great dissimilarity of form due to difference in age. Like *D. intercalatum*, *novemcostatum*, *truncatum* and many other *Dentaliidae* this species is less curved in old age, while the apex becomes more and more truncated, until in some specimens the shell is almost equally wide from apex to anterior aperture.

The specimens, afterwards named *aratorum* by Mr Cooke had been labelled *D. Reevii* Desh. MSS. by Mr Mac-Andrew. I do not know whether the latter had compared these with authentic specimens of *Reevii*, or that he drew his conclusions from the insufficient note of Fischer on that species. I agree however with Mr Pilsbry that Fischer's provisional note gives too little information to make an identification possible and therefore do not adopt Deshayes's MSS. name.

The same is the case with *D. laugieri* Jousseaume which perhaps is identical with or at least nearly related to this species.

Here follow the descriptions.

D. lineolatum Cooke. Pl. V, figs 25, 26, 27.

Fig. 16. Anterior aperture of "*D. lineolatum* Cooke".

Shell solid, pale amber coloured, acuminate, curved toward the apex, fluted with 9 angulated, very high equidistant ribs; interstices and some of the ribs themselves longitudinally lineated, and decussated by very minute transverse striae. Apex entire. Length 1,75, breadth at base 0,25 inch. (Cooke).

Gulf of Suez (Mac-Andrew).

In fresh specimens the interstitial lines are very marked; they are parallel to the ribs, which are themselves generally bisected by a similar line. (Cooke).

D. aratorum Cooke. Pl. V, figs 31—34.

Shell solid, pale amber coloured, acuminate, arcuate, not very strongly but distinctly fluted with 11 or 12 ribs, the interstices and some of the ribs themselves longitudinally strongly lineated, impressed interstitial lines about 4; apex entire. Length 1,5, width at base 0,15 inch. (Cooke).

Fig. 17. Anterior aperture of "*D. aratorum* Cooke".

Gulf of Suez. 10—30 fms (Mac-Andrew).

Very distinct from *D. lineolatum* Cooke, which it nevertheless strongly resembles in its sculpture. This shell is more curved, the ribs are never less than eleven and are comparatively obscure, while in *lineolatum* there are always nine and they are very marked and prominent.

Mac Andrew perceived that *Belcheri* Sow. was wrong and has corrected to "*Reevii* Desh. MSS." I have no idea what this refers to, so will describe the species, which is a good one (Cooke).

D. clavus Cooke. Pl. V, figs 28—30.

Shell solid, whitish, ungraceful, slightly arcuate, almost equally wide from apex to base; fluted with about 11 very indistinct ribs, interstices longitudinally lineated, the lines sometimes nearly equal to the ribs; apex entire. Length 1,75, diam. 0,2 inch. (Cooke).

Fig. 18. The apical part of "*D. clavus* Cooke".

Gulf of Suez (Mac-Andrew).

A remarkably ungraceful shell, reminding one of thick specimens of *novemcostatum* Lam. The breadth is almost the same throughout, ribs very indistinct and impossible to count at the base, interstitial lines proportionately strong (Cooke).

D. reevei "Desh." Fischer.

This species, which will shortly be described by M. Deshayes, is white, arcuate, having 9 longitudinal ribs. The interstices are very finely striated transversely, and some longitudinal narrow ribs run along them. (From P. & Sh.).

Suez.

D. laugieri Jousseaume.

Shell white, solid, cylindrical, slightly arcuate, longitudinally costate; ribs 9, equal, strong, rounded, smooth; the intervals flat, wider, with 3 to 5 delicate striae. Length 40—48, diam. 7 mill. (From P. & Sh.).

Aden; Suez.

*24. *Dentalium decemcostatum* Brazier.

1877. *Dentalium decemcostatum* Brazier, Proc. Linn. Soc. N. S. Wales, II, p. 55.
1897. *Dentalium decemcostatum* Brazier. Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 8.

Diagnosis. Shell tapering, thin white, slightly arched, longitudinally 10-ribbed, ribs

somewhat sharp, interstices nearly flat, transversely finely striated, apex with a small perforation; basal aperture large, circular. (Braz.).
Length 20 mill., diam. of apex 0,5 mill., diam. of base 2,5 mill.

Distribution. Katow, New-Guinea, 8 fathoms, sandy mud (Chevert Exp.).

25. *Dentalium tasmaniense* Tenison Woods. Pl. VI, fig. 34.

1877. *Dentalium tasmaniensis* (sic!) T. W., Proc. Roy. Soc. Tasmania for 1876, p. 140.
1897. *Dentalium tasmaniensis* (sic!) T. W., Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 9.

Stat. 302. 10° 27'.9 S., 123° 28'.7 E. Timor Sea. 216 Metres. Sand and coralsand. 1 Spec.

Diagnosis. Shell small, solid, white, slender, slowly increasing, slightly curved; equally 8-ribbed, the intervals often subcostate; apex entire. Length 10,5, diam. 1,5, diam. of apex 0,5 mill. (T. W.).

Distribution. Northwest coast of Tasmania.

Remarks. The only specimen obtained by the Siboga is 10-ribbed instead of 8-ribbed as *tasmaniense* but for the rest is so well covered by the diagnosis of that species that little doubt is left that the two can be identified. The Siboga specimen has a length of 14 mill., with a greatest diameter of 1,7 mill. The ribs are rounded and rather prominent, and there are generally three smaller riblets in each interval.

26. *Dentalium sinuosum* n. sp. Pl. VI, fig. 22.

Stat. 114. 0° 58'.5 N., 122° 55' E. Kwandang-bay-entrance. 75 Metres. Hard sand, very fine. 2 Spec.
Stat. 204. 4° 20' S., 122° 58' E. Between islands Wowoni and Buton. 75—94 Metres. Sand with dead shells. 1 Spec.
Stat. 294. 10° 12'.2 S., 124° 27'.3 E. Timor Sea. 73 Metres. Soft mud with very fine sand. 6 Spec.

Diagnosis. Shell moderately curved, very slender, finely tapering. Sculpture of nine narrow sharp riblets at apex, increasing to double that number by the intercalation of a secondary riblet in each interval. Ribs equidistant, slightly elevated, persistant toward the anterior aperture, separated by flat, smooth interspaces with regular growth striae. Shell from time to time a little inflated; after each annular swelling one or two growthlines are more marked than the others. Apex very much attenuated, simple, without notch or slit, the ribs clearly visible. Anterior aperture circular, a little oblique, regularly crenated by the 18 riblets; thin edged. Colour of a uniform yellowish tint, young specimens brilliant and white.
a. Length 33 mill., greatest diameter 2,3 mill.
b. Length 23 mill., greatest diameter 2,1 mill.

27. *Dentalium paucicontortum* n. sp. Pl. VI, figs. 25—28.

Stat. 95. 5° 43'.5 N., 119° 40' E. Sulu Archipelago. 522 Metres. Stony bottom. 31 Spec.
Stat. 105. 6° 8' N., 121° 19' E. Sulu Archipelago. 275 Metres. Coral bottom. 1 Spec.

Diagnosis. Shell small, solid and strong, straight or with a sudden little curve at the apex. Sculpture of 8—14 narrow rounded rather strong riblets at the top, increasing their number by intercalation of secondary riblets which appear at irregular distances from the top, but not in each interval, the number of riblets near aperture varying between 15—20. Riblets sometimes persistent, sometimes subobsolete toward aperture and often slightly twisted round the shell's longitudinal axe, especially near the apex. Growth striae inconspicuous. Apex with a short wide incision, a little asymmetrical on the convex side. It is generally worn by erosion, the apex giving then the impression of being obliquely truncated. There is in one individual a short supplemental tube around the anal orifice. Aperture rounded, not oblique, with moderately thin, but strong edges. Colour white or grayish white, sometimes totally covered by a dark brown deposit.

a. Length 17 mill., greatest diameter 2 mill.
b. Length 15 mill., greatest diameter 2 mill.
c. Length 11 mill., greatest diameter 1,5 mill.

28. *Dentalium robustum* Brazier. Pl. VI, fig. 29.

1877. *Dentalium robustum* Brazier, Proc. Linn. Soc. N. S. Wales, II, p. 56.
1897. *Dentalium robustum* Brazier. PILSBRY & SHARP, Man. of Conch., vol. XVII, p. 12.

Stat. ? 1 Spec.

Diagnosis. Shell nearly straight, thick, dull white, longitudinally 9-ribbed, ribs rounded, wide apart, narrow toward the apex, interstices flattened, smooth; apex with small perforation, entire; aperture thickened, regular.
Length 20, diameter of apex 0,75, base 2,5 mill. (BRAZIER).

Distribution. Katow, New Guinea 8 fathoms, sandy mud and coral (Chevert Exp.).

Remarks. Probably a young shell was obtained by the Siboga Exp. The label got somehow lost, and the exact locality being now unknown it might be substituted by the more general indication of Eastern part of the Malay Archipelago. I have not seen specimens of *robustum* but its diagnosis covers our Siboga specimen rather well. Ours is more attenuated and the anterior aperture is not thickened, but these differences may be owing to youth. It greatly resembles *D. enneagonum* K. Martin of the Java tertiary (Sammlungen des geol. Reichsmus. in Leiden, 1° Serie, Band III, 1883—1887, Palaeontol. Erg. v. Tiefbohrungen auf Java, K. MARTIN, p. 187, Tab. X, fig. 186). There are in some of the intervals one or two very faint riblets, arising past the middle of the shell's length.

29. *Dentalium Cookei* Pilsbry & Sharp. Pl. VI, figs 20, 21.

1885. *Dentalium acus* Cooke, Ann. Mag. N. H. (5), XVI, p. 274.
1897. *Dentalium Cookei* Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 29.
Not *Dentalium acus* Eichwald 1856.

Stat. 204. 4° 20′ S., 122° 58′ E. Northern entrance of Buton strait. From 75—94 Metres. Sand with dead shells. 1 Spec.
Stat. 207. 5° 7′.5 S., 122° 39′ E. Buton strait. 148 Metres. Grey mud. 2 Spec.

Diagnosis. Shell thin, very narrow, acuminate, polished, subpellucid, little arcuate; fluted with about 14 ribs, which are not equidistant, only slightly elevated, but distinctly defined at their bases; ribs at the apex coalescent and vanishing; interstices shallow and polished. Length 31 mill., diam. at base 1,6 mill. (Cooke).

Distribution. Gulf of Suez. (Mac-Andrew).

Remarks. Of the three Siboga specimens two are rather young shells and show the greatest resemblance to the type in the Mac-Andrew collection at Cambridge, also a young shell. The third seems much older. It is longer, less attenuated and the apex is ribbed not smooth as in the other specimens. It has a length of 42 mill., with a greatest diam. of 2,1 mill. Anteriorly the tube is rather irregular, many circular constrictions indicating interrupted growth, while the ribs become nearly obsolete; growth striae rather conspicuous. *Cookei* is probably nearly related to *sinuosum*; it is however more slender and distinguished by its smooth apex and unequidistant ribs.

30. *Dentalium pluricostatum* n. sp. Pl. VI, figs 6, 7.

Stat. 153. 0° 3'.8 N.. 130° 24'.3 E. Bougainville Strait. 141 Metres. Fine and coarse sand with dead shells. 6 Spec.

Stat. 204. 4° 20' S., 122° 58' E. Buton Strait. From 75—94 Metres. Sand with dead shells. 1 Spec.

Diagnosis. Shell long and slender, moderately curved, fragile. Sculpture of nine sharp ribs at the top, separated by flat interstices, which appear to be microscopically longitudinally striated when strongly magnified. The striae disappear rapidly, and not far from the apex a secondary riblet appears in each interval, sometimes followed by a third and fourth and continuing together with the primary ribs for about the greatest half of the shell's length. They then become obsolete, the anterior half of the shell being nearly smooth, with only faint indications of longitudinal sculpture. Growth striae rather conspicuous, microscopically segmenting the intervals. Apex without slit or notch. Aperture round, very little oblique, with extremely thin edges. Colour near apex white or yellowish-white, toward aperture white and transparent often with a pearly lustre.

a. Length 60 mill., greatest diam. 3,5 mill.
b. Length 65 mill., greatest diam. 3,5 mill.
c. Length 52 mill., greatest diam. 3 mill.

*31. *Dentalium Lessoni* Deshayes. Pl. I, fig. 11.

1825. *Dentalium Lessoni* Deshayes, Mém. Soc. Hist. Nat. Paris II, p. 357, pl. 16, fig. 13.
? *Dentalium Lessoni* Deshayes. Chenu, Illustr. Conchyl., p. 5, pl. 5, fig. 4 (not 4*a*).
1897. *Dentalium Lessoni* Deshayes. Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 8, pl. 6, figs 86, 90.
Not *Dentalium lessonii* Sowerby, 1860, 1872.

Diagnosis. Shell rather straight, cylindrical, whitish-gray, with 8 to 10 ribs, ribs obtuse, depressed, disappearing at the aperture. Allied to *D. novemcostatum*, but distinguished by form,

curvature, and disposition of the ribs. It is narrower, longer, less curved, constantly of a yellowish-white uniform color, without transverse zones. The ribs, numbering 8, 9 or 10, are contiguous at their bases, moderately raised and rounded. They are more elevated toward the apex, diminishing gradually and disappearing toward the aperture. They are interrupted by some growth lines. The aperture is small relative to the length of the shell.

Length 50, diam. 4 mill. (P. & Sh. from Desh.).

Distribution. New Guinea (Lesson).

Remarks: *Pluricostatum* and *Lessoni* resemble each other in many points. *Pluricostatum* is distinguished by being more slender and having secondary riblets while the transverse sculpture is more pronounced than in *Lessoni*. The possibility exists that a greater series of specimens may prove that the forms intergrade.

Group of D. shoplandi Jousseaume.

14—21 ribs at and near apex.

Key to species.

I. Shell cylindric or nearly so.
- *a*. 14—19 longitudinal strongly granose ribs; length 55 mill. about 7—8 times the greatest diameter . . . . . *transversostriatum.*
- *a'*. 17—21 subequal narrow ribs, increasing to 25; conspicuously transversely striated; length 78 mill. about 7—8 times the greatest diam. . . . . *shoplandi.*
- *a''*. 16 narrow rounded ribs at apex increasing to about 40. Transverse structure inconspicuous. Length 45 about 7—8 times the greatest diam. . . . . *malayanum.*

II. Shell slightly dorso-ventrally compressed; 16 ribs at and near apex, secondary sculpture mainly or arising earlier on the concave curve.
- *a*. Sculpture becoming anteriorly subobsolete. Length 35—45 mill., 11—10 times the greatest diam. . . . . *sedecimcostatum.*
- *a'*. Ribs increasing to 48 at the anterior aperture. Length 35, diam. of apert. 2,8 mill. . . . . *compressiusculum.*
- *a''*. Ribs cancellated. Length 40—60 mill., 9—10 times the greatest diam. *martensi.*
- *a'''*. Ribs simple, the interstices conspicuously transversely striated. Length 51 mill. about 12—13 times the greatest diam. . . *clathratum.*

*32. *Dentalium shoplandi* Jousseaume. Pl. I, fig. 12.

1894. *Dentalium shoplandi* Jouss. Bull. Soc. Philomath. de Paris, (8), VI, p. 102.
1897. *Dentalium shoplandi* Jouss. Pilsbry & Sharp, Man. of Conchology, vol. XVII, p. 28, pl. 12, fig. 100.

Diagnosis. Shell large, but slightly curved, nearly straight, solid, slowly tapering; cream-white with whitegray-white ribs. Sculpture: near the apex 17 subequal but unequally spaced, narrow, sharply defined riblets very much narrower than the interspaces; these continue to the aperture, increasing in size; their number is early increased by the intercalation of some interstitial threads, mainly on the concave side, so that at the aperture there are 25 unequal, unevenly spaced ribs and threads; the whole surface densely and conspicuously striated transversely, the striae unequal, like cords scattered among threads, crenulating the riblets. Aperture oblique, subcircular, a trifle wider than long, the peristome jagged from fracture. Apex large, the orifice simply circular, without notch or slit.
Length 78,5, diam. at aperture 10, at apex 3,2 mill. (P. & Sh.).

Distribution. 50 miles off Aden in 678 fms.

Remarks. A large species apparently without near allies. It is remarkable for the prominence of the growth striae, and the clearly carved ribs of the surface. (P. & Sh.).

33. *Dentalium transversostriatum* n. sp. Pl. IV, fig. 23.

Stat. 212. 5° 54'.5 S., 120° 19'.2 E. off Saleyer. 462 Metres. Fine grey mud. 3 Spec.

Diagnosis. Shell but slightly curved, the greatest bend near the apex, solid, of a yellowish tint, lusterless. The sculpture consists of 14—19 strong prominent sharp-edged longitudinal ribs, separated by rather wide concave interstices in some of which an interstitial riblet arises. The longitudinal ribs are crossed by a pronounced transverse sculpture, consisting of regular elevated striae, which become almost spinulose on the longitudinal ribs, and can be felt by rubbing one's nail over the shell's surface. Apex simple, or with a long wide slit on the convex side. Anterior aperture circular rather oblique with very thick edges.
Length 55, diam. of apert. 7,5 mill. Length of slit 8 mill.

Remarks. To my regret I had no opportunity of comparing specimens of *D. carduus* Dall [1]), a species reported from several stations in the West Indian Archipelago. It bears a very great resemblance to *transversostriatum* but as it differs from it in some minor details, it seems advisable to distinguish as yet the Western Atlantic from the Indopacific form. In the East Indian specimens the sculpture remains distinct toward the anterior aperture and the edge of the peristome is very thick, measuring in one specimen 1,2 mill. in another 1 mill., two qualities which distinguish it from *carduus*. The number of the ribs of *carduus* is not given.

34. *Dentalium malayanum* n. sp. Pl. V, figs 4, 5.

Stat. 133. Anchorage off Lirung, Salibabu Island up to 36 Metres. Mud and hard sand. 2 Spec.
Stat. 159. 0° 59'.1 S., 129° 48'.8 E. North of Kofian Island. 411 Metres. Coarse sand. 1 Spec. juv.?
Stat. 300. 10° 48'.6 S., 123° 23'.1 E. Timor Sea. 918 Metres. Fine grey mud. 2 Spec.

Diagnosis. Shell slightly curved, solid; sculpture of 16—17 narrow rounded ribs at

1) *D. carduus* Dall. Blake, Rep. Bull. Mus. Comp. Zool. XVIII, (1889), p. 423, pl. 27, fig. 3.

apex, increasing toward aperture to about 40 and becoming gradually broader and stronger. Intervals at the top wide and rather flat, concave and narrower than the ribs at the anterior aperture. Ribs rather strong, well rounded and shining, equal in size, here and there alternating with some smaller ones. Apex circular with strong walls and a moderately deep slit. Anterior aperture rounded rather oblique with strong edges.

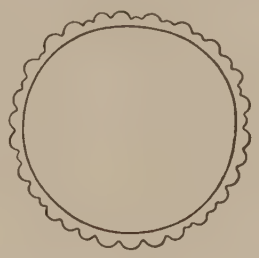


Fig. 19. Anterior aperture of *D. malayanum*.

Colour grayish white or with a yellowish tint.

Length 45, diam. of aperture 5,9 mill.

Length 47, diam. of aperture 6 mill.

35. *Dentalium sedecimcostatum* n. sp. Pl. VI, figs 8—11.

Stat. 45. 7° 24′ S., 118° 15′.2 E. 794 Metres. Fine grey mud, with some radiolariae and diatomes. 1 Spec.
Stat. 52. 9° 3′.4 S., 119° 56′.7 E. 959 Metres. Globigerina ooze. 9 Spec.
Stat. 88. 0° 34′.6 N., 119° 8′.5 E. 1301 Metres. Fine grey mud. 1 Spec.
Stat. 156. 0° 29′.2 S., 130° 5′.3 E. 469 Metres. Coarse sand and broken shells. 1 Spec.
Stat. 178. 2° 40′ S., 128° 37′.5 E. 835 Metres. Blue mud. 1 Spec.
Stat. 223. 5° 44′.7 S., 126° 27′.3 E. 4391 Metres. Dark mud. 1 Spec.
Stat. 241. 4° 24′.3 S., 129° 49′.3 E. 1570 Metres. Dark sand with small stones. A fragment.
Stat. 300. 10° 48′.6 S., 123° 23′.1 E. 918 Metres. Fine grey mud. 9 Spec.
Stat. 314. 7° 36′ S., 117° 30′.8 E. 694 Metres. Fine sandy mud. 1 Spec.

Diagnosis. Shell slightly dorso-ventrally compressed, moderately curved, white porcellanous, shining, sometimes chalky; often with a black incrustation near the apex (generally most of it on the concave side) and with light and dark brown patches, irregularly distributed over the rest of the shell's surface. Sculpture: near the apex there are 16 narrow rounded ribs, closer on the concave curve than on the convex curve and separated by wider intervals. Anteriorly there arises in each interval a median thread; it arises earlier on the concave side and soon equals in strength the primary ribs; on the convex curve it remains small. Anteriorly the whole sculpture becomes subobsolete, old specimens being quite near the anterior aperture nearly smooth. Growth striae numerous and close, obliquely crossing the longitudinal sculpture. The apex in young specimens has a short wide slit, in older specimens it is entire, dorso-ventrally compressed with thick walls, thickest on the concave margin.

Anterior aperture very oblique, slightly dorso-ventrally compressed, with thin margin.

a. Length 29, diam. at apert. 3 × 2,6, diam. at apex 0,3 mill.
b. Length 38, diam. at apert. 3,4 × 3,2, diam. at apex 0,4 mill.
c. Length 39, diam. at apert. 4 × 3,8, diam. at apex 1,1 mill.
d. Length 45, diam. at apert. 4,2 × 4,1, diam. at apex 0,9 mill.

(The lateral diameter is given first).

36. *Dentalium compressiusculum* n. sp. Pl. VI, fig. 12.

Stat. 241. 4° 24′.3 S., 129° 49′.3 E. 1570 Metres. Dark sand with small stones. 1 Spec.

Diagnosis. Shell moderately curved, slightly dorso-ventrally compressed posteriorly,

the later half nearly cylindrical; slender, rather fragile, of a dirty yellowish colour. Sculpture of 16 narrow rounded ribs at apex, increasing by intercalation of secondary riblets to the number of 32 at about the middle of the shell's length, the riblets on the concave curve appearing first. Lower down tertiary riblets arise, but only on the concave curve making together a number of 48 equal narrow rounded riblets at the anterior aperture. Apex with a slight notch on the convex side. Anterior aperture subcircular, a little oblique, acutely edged. Length 31,5 mill., diam. of aperture 2,8 mill.

37. *Dentalium Martensi* n. sp. Pl. IV, fig. 19. Pl. V, fig. 1—3.

Stat. 88. 0° 34′.6 N., 119° 8′.5 E. 1301 Metres. Fine grey mud. 5 Spec. and some fragments.
Stat. 223. 5° 44′.7 S., 126° 27′.3 E. 4391 Metres. Brown and black mud gradually changing into bluish grey mud. A fragment.

Diagnosis. Shell near the apex a little dorso-ventrally compressed, more rounded toward the anterior aperture; nearly straight or with a slight curve at the top. Sculpture of about 16 sharp cancellated longitudinal ribs, separated by wide plano-concave intervals. Early on the concave side there appears in each interval one interstitial riblet, soon equalling the first in size; some tertiary threads sometimes arise near the aperture. On the convex side the interstitial riblets appear later and generally remain smaller than the ribs. The ribs are finely cancellated with very irregular little rounded teeth. The sharp edges of the ribs often are worn off by erosion. The intervals are transversely striated but not conspicuously so, being in some shells smooth with hardly any indication of transverse sculpture. Apex dorso-ventrally compressed, entire with an oval opening, or with a moderately long rather wide slit on the convex side. Anterior aperture nearly circular a little dorso-ventrally compressed.

Fig. 20. Anterior aperture of *D. Martensi*.

Length 56, diam. of apert. 6,3 × 6, of apex 1,7 mill.
Length 54, diam. of apert. 5,5 × 4,9, of apex 0,7 mill.
Length 41, diam. of apert. 5,1 × 5, of apex 1,8 mill.
(The lateral diameter is given first).

*38. *Dentalium clathratum* v. Martens. Pl. III, fig. 53.

1881. *Dentalium clathratum* E. von Martens, Sitzungsber. der Gesellsch. naturf. Fr. zu Berlin, Jahrg. 1881, p. 66.
1897. *Dentalium clathratum* E. von Martens. Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 84.

Diagnosis. Shell rather straight, elliptical in section, white, opaque, with about 16 angular, narrow, equal ribs, with smaller ones sparsely intercalated towards the aperture, the interstices conspicuously transversely striated. Apical orifice thick-edged; slit on the convex side, narrow, long. Length 51, transverse diam. of aperture 4, dorso-ventral diam. $3^1/_3$ mill., diam. of apex $^2/_3$ mill. (Mart. from P. & Sh.).

Distribution. Near Moreton Bay, Eastern Australia, 550 fms. (Gazelle Exp.).

Remarks. Similar to *D. compressum* Watson of the West Indies. The interspaces between the ribs are about three times as wide as the ribs themselves, where smaller riblets are not interposed (MART.).

Dr. JOH. THIELE of the Zoological Museum of Berlin had the kindness of sending me a photograph of the hitherto unfigured *D. clathratum*, which is now reproduced in this Report. There is some resemblance between *D. Martensi* and *D. clathratum*, but I believe the differences to be great enough to distinguish them as different species. *Martensi* is a stronger shell and the diameter increases more rapidly than in *clathratum*, while the secondary and tertiary riblets are better developed. The cancellation on the ribs, which is a striking feature in *Martensi*, was not noticed by v. MARTENS. but Dr. JOH. THIELE informs me, that he holds it for possible that better preserved specimens of *D. clathratum* might prove to have slightly cancellated ribs.

Group of D. MULTISTRIATUM.

Irregularly many-ribbed species of rather small size, often with alternating translucent and opaque encircling bands, or dots on the ribs; apex either simple, notched or tubiferous (P. & SH.).

I. Fine crowded striae, continuous from base to apex . . . . . *multistriatum.*

II. About 10—13 riblets at the top.

a. Length 31 mill., greatest diam. 4 mill. . . . . *Belcheri.*

b. Length 19 mill., greatest diam. 2 mill. . . . . *variabile.*

*39. *Dentalium multistriatum* Deshayes. Pl. I, fig. 19.

1825. *Dentalium multistriatum* Deshayes, Mém. Soc. Hist. Nat. Paris, II, p. 358, pl. 18, fig. 11.
1897. *Dentalium multistriatum* Deshayes. PILSBRY & SHARP, Man. of Conch., vol. XVII, p. 251, pl. 39, fig. 5.

Diagnosis. Small, narrow, generally but little curved, white, yellowish or grayish; entirely covered with fine, crowded striae, continuous from base to apex. In some individuals these striae are a little wider, less crowded, with a fine thread interposed; but in the majority of shells they are equal, rounded, sometimes quite regularly spotted with gray or translucent white on an opaque white ground. Apex ordinarily worn, the striae often deeper than at the base; aperture perceptibly oblique, with very sharp peristome. Length 20, greatest diam. 3 mill. (P. & SH. from DESH.).

Distribution. Found with *Dentalium* variabile and presumably from India (DESH.).

*40. *Dentalium Belcheri* Sowerby. Pl. I, fig. 18.

1860. *Dentalium belcheri* Sowb. juv., Thes. Conch. III, p. 101, pl. 224, figs 28, 29.
1872. *Dentalium belcheri* Sowb., Conch. Icon. XVIII, pl. 1, fig. 1*a*, *b*.
1897. *Dentalium belcheri* Sowb. PILSBRY & SHARP, Man. of Conch., vol. XVII, p. 60, pl. 14, figs 29, 30.

Diagnosis. Shell moderately curved, sculptured with 11—13 rather strong rounded longitudinal ribs; intervals microscopally longitudinally striated over the whole surface, sometimes with one or two interstitial riblets. Sculpture becoming weaker toward the anterior aperture. Colour white or pinkish, or white becoming rosy towards the apex, with faint maculation on the ribs. Of the three specimens in the British Museum two have the apex entire, while one has a supplemental tube, a little transversely compressed.
Length 31, greatest diam. 4 mill.
Length 24, greatest diam. 3,5 mill.

Distribution. East Indian Archipelago (Sowb.).

*41. *Dentalium variabile* Deshayes. Pl. I, fig. 17.

1825. *Dentalium variabile* Desh., Mém. Soc. Hist. Nat. Paris, II, p. 367, pl. 16, fig. 30.
1860. *Dentalium variabile* Desh. Sowerby, Thes. Conch. III, p. 101, pl. 224, fig. 30.
1872. *Dentalium variabile* Desh., Conch. Icon. XVIII, pl. 4, fig. 26.
1872. *Dentalium variabile* Desh. Martens, Journal Linn. Soc. Lond. XXI, p. 200.
1897. *Dentalium variabile* Desh. Pilsbry & Sharp, Man. of Conch. vol. XVII, p. 60, pl. 14, figs 26—28.

Diagnosis. Shell rather small, moderately arcuate, not much attenuated posteriorly, solid; white, with numerous encircling grayish-translucent zones, more pronounced on the ribs, which appear articulated with grayish and white. Sculpture of 10 or 11 strong narrow ribs with concave interstices, at and near the apex; a median thread soon arising in each interval, and becoming nearly equal to the primary ribs, and later other interstitial riblets arise in some intervals, so that at the aperture there are about 22, 24 or more riblets. Aperture round, slightly polygonal. Anal orifice small and circular with thick margin. No slit or notch.
Length 19, diam. aperture 2, diam. apex 1,1 mill.
Length 18, diam. aperture 2, diam. apex 1 mill. (P. & Sh.).

Distribution. Mergui Archipelago at Mergui on mud-flats and Sullivan I. in 7—10 fms (Anderson); Philippine Isl. (Sowb., Acad. Coll.) found at a dealers with mainly small Indian shells (Desh.).

Differs from *D. Belcheri* in being narrower and less rapidly enlarging. The dotted ribs are characteristic, but their number varies considerable. It sometimes reaches 30 mill. length (P. & Sh.).

Subgenus **Fissidentalium** Fischer 1885.

1885. *Fissidentalium* Fischer, Manual de Conchyliologie, p. 894. Type *D. ergasticum* Fisch.
1894. *Schizodentalium* Sowerby, Proc. Malac. Soc. Lond. I, p. 158. Type *S. plurifissuratum* Sowb.
1897. *Fissidentalium* Fischer. Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 63.

Shell large and solid, sculptured with many longitudinal riblets, the apex typically with a long slit, but often simple, sometimes with a slit divided into a series of fissures. (P. & Sh.).

Key to Species.

I. Shell cylindrical.

a. Rather coarse longitudinal striation. Length 115, greatest diam. 15 mill. *magnificum.*

a'. Sculptured with about 80 threadlike riblets. Length 90, greatest diam. 10 mill. *profundorum.*

II. Shell decidedly compressed, nearly straight.

a. Nearly elliptical in section. . . . . *Hungerfordi.*

a'. Trigonal in section . . . . . *Sibogae.*

42. *Dentalium profundorum* E. A. Smith. Pl. IV, figs 14—16.

1894. *Dentalium profundorum* Smith, Annals and Mag. N. H. (6), XIV, p. 167, pl. 4, fig. 18.
1897. *Dentalium profundorum* Smith. PILSBRY & SHARP, Man. of Conch., vol. XVII, p. 79, pl. 6, fig. 82.

Stat. 88. 0° 34'.6 N., 119° 8'.5 E. 1301 Metres. Fine grey mud. 4 Spec.
Stat. 101. 6° 15' N., 120° 21' E. 1270 Metres. Fine grey mud. 1 Spec.

Diagnosis. Shell large solid, moderately curved, sculptured with about 80 fine threadlike plano-convex ribs, usually rather broader than the interstices; with numerous fine growth striae making faint and regular impressions on the ribs. Colour dull buff, but sometimes brilliantly white. Peristome subcircular, white inside, in some specimens very thickly edged, in others rather thin. Length 90, greatest diam. 10 mill.

Distribution. Off Colombo, Ceylon 6° 32' N., 79° 37' E. in 675 fms (Investigator).

Remarks. The four specimens of Stat. 88 are exactly like those examined by Mr. E. A. SMITH. They are dull buff and much eroded showing many irregular patches where the shell's outer layer has been broken away. Only one of these specimens has a slit measuring nearly 5 mill.

The specimen of Stat. 101 is of a beautiful shining white and has a long narrow slit measuring 14 mill.; the white colour is probably due to the local condition of the soil. The same has been observed in *D. candidum* Jeffreys, a species belonging also to the subgenus *Fissidentalium* and distributed over the eastern and western Atlantic and the gulf of Mexico. DALL remarks about that species: "Under favorable circumstances this species may be of a most brilliant milk-white, but nearly all the specimens are dull ashy gray in color, even when living and in perfect order. I suppose the white ones are those which happen to live in pure sand, while the ordinary form comes from mud or ooze".

*43. *Dentalium magnificum* E. A. Smith. Pl. II, figs 32, 32*a*.

1896. *Dentalium magnificum* E. A. Smith, Ann. Mag. N. H. (6), XVIII, p. 371.
1897. *Dentalium magnificum* E. A. Smith. PILSBRY & SHARP, Man. of Conch., vol. XVII. p. 78 and 251.
1898. *Dentalium magnificum* E. A. Smith. ALCOCK & ANDERSON, Illustr. of the Zool. of the Investigator, Mollusca Pt. II, pl. VII—VIII. Calcutta.
1902. *Dentalium magnificum* E. A. Smith, figured in A. ALCOCK. A naturalist in Indian seas.

Diagnosis. Shell large, thick, moderately curved, perceptibly tapering posteriorly, obliquely truncated anteriorly; sculptured everywhere with many delicate ribs crenulated by transverse striae; slit narrow, of varying length. Length 115, greatest diam. 15 mill.

Distribution. Lat. 8° 40′ N., 81° 27′.35 E. in 637—800 fms.; off Trincomalee, east coast of Ceylon.

Remarks. This fine species is as large as the Japanese *D. vernedei*[1]) or the fossil *D. grande* Desh. The form, however, is more rapidly tapering than that of either, and the sculpture is not precisely similar; the aperture is larger than in either of the species quoted and almost circular. The longitudinal ridges are fine and numerous, numbering about twenty-five to thirty at an inch from the apex. Towards the anterior end intervening riblets appear, so that the interstices, which above are broader than the lirae, become narrower. The lines of growth are distinct, and on crossing the riblets towards the posterior end produce a granulated appearance; the ridges are much smoother anteriorly and less elevated. The length of the fissure is variable, but this is probably chiefly due to damage. In the most perfect specimen it is 13 millimetres in length and rather more than half a millimetre in width. All three specimens exhibit reparation of injuries at the anterior end, and in two the posterior extremity has been broken off; these injuries are probably done by fishes or crustaceans. The shells are whitish, but coated with a dark brown earth deposit. The Rev. Professor H. M. Gwatkin informs me that the radula is quite normal, and that the figure given by Sars of Antalis striolata closely represents it, except that in the present species the central tooth is a little wider and the inner edge of the lateral makes a smoother muzzle. (E. A. Smith).

44. *Dentalium Hungerfordi* Pilsbry & Sharp. Pl. II, fig. 30.

1888. *Dentalium compressum* Sowb., P. Z. S. p. 569, pl. 28, fig. 18.
1897. *Dentalium Hungerfordi* Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 84, pl. 6, fig. 83.
Not *D. compressum* Watson 1879.

Stat. 105. 6° 8′ N., 121° 19′ E. 275 Metres. Coralbottom. 1 Spec. juv.

Fig. 21. Ant. apert. of *D. Hungerfordi.*

Diagnosis. Shell rather wide, almost straight, acute; unequally compressed; toward the apex slightly inclined. Tawny, irregularly banded with brown. Sculptured with very numerous plano-convex unequal riblets, and cancellated by, but slightly conspicuous transverse striae. Slit long and narrow. Aperture somewhat oval.
Length 72, greatest diam. 12 mill.

Distribution. Hongkong.

Remarks. A very distinct and remarkable species, more highly coloured than its congeners; but it is chiefly distinguished by its curiously compressed form. A second specimen, brought by Dr. Hungerford, is only 62 millimetres in length, and rather wider in proportion. It

1) *D. Vernedei* Sowerb. measures: Length 90—130, diam. of aperture 11—15 mill.

is rather lighter in colour, but presents all the same characters confirming the specific importance of the chief characteristic, which might otherwise have been thought accidental (Sowb.).

A young specimen was obtained measuring 30 mill., with a greatest diam. of 5 × 4,3 mill. (lateral diam. first). It shows only the well curved apical part of the full-grown shell. It is whitish with regular transverse bands of light brown; the ribs are irregularly impressed by the growthlines and there is a narrow slit measuring 2,7 mill.

45. *Dentalium Sibogae* n. sp. Pl. IV, figs 17, 18.

Stat. 159. 0° 59'.1 S., 129° 48'.8 E. 411 Metres. Coarse sand. 1 Spec.

Diagnosis. A big wide shell, totally straight but for a hardly perceptable inclination at the top; trigonally compressed, the "excurved" side flat, the "incurved" side with one very obtuse angle. Sculptured with numerous subequal riblets, very like *D. Hungerfordi*. Apex with a long slit, measuring 8,5 mill. Anterior aperture trigonal, the angles rounded. Length 70 mill.; dorso-ventral diam. of anterior apert. 10 mill. lateral diam. 15 mill., diam. of apex 2,2 mill.

Fig. 22. Ant. apert. of *D. Sibogae*.

Remarks. *Sibogae* is nearly related to *Hungerfordi*. The difference lies in the shape, *Sibogae* being quite flattened on the excurved side, while in *Hungerfordi* that side is convex.

Subgenus **Tesseracme** Pilsbry & Sharp 1898.

1897. *Tesseracme* Pilsbry & Sharp, Manual of Conch., vol. XVII, p. 249.

Small or moderate sized shells with the tube square at and near the apex, having angles on the convex, concave and two lateral sides, becoming subcircular at the aperture. Generally costulate between the angles, sometimes smooth; the apical orifice occupying a short pipe, or without this and square or round (P. & Sh.).

Key to Species.

I. The four primary ribs bifid or trifid . . . . . *dispar*.

II. The four primary ribs serrate . . . . . *quadricostatum*.

III. The four primary ribs not split or serrate.

a. Intervals smooth.

b. 32 riblets at aperture, greatest diameter about 11 times the length. *dipsycha*.

b'. 36 riblets at aperture, greatest diameter about 6 or 7 times the length. *quadrapicale*.

a'. Intervals striated . . . . . *tetraplcurum*.

46. *Dentalium dispar* Sowerby. Pl. II, figs 22, 23.

1860. *Dentalium dispar* Sowerby, Thes. Conch. III, p. 103, pl. 224, fig. 37.
1872. *Dentalium dispar* Sowerby, Conch. Icon. XVIII, pl. 4, fig. 25.

1877. *Dentalium dispar* Sowerby. BRAZIER, Proc. Linn. Soc. N. S. Wales II, p. 58.
1897. *Dentalium dispar* Sowerby. PILSBRY & SHARP, Man. of Conch., vol. XVII, p. 32, pl. 4, figs 52—56.

Stat. 181. Ambon. 54 Metres. Mud, sand and coral. 1 Spec.

Diagnosis. Shell rather slender, the length about 9 times the greatest diameter in adults; earlier third well curved, the rest of the length but slightly arcuate; much attenuated toward the fine apex; rather thin, white or bluish-white, glossy and brilliant. Sculpture: four angled at apex (square in section), the angles dorsal, ventral and lateral, continuing as keels which rapidly become obsolete (extending two thirds the length of shell in a specimen 15 mill. long, but only one third the length in one 30 mill. in length); each of the four primary ribs bifid or trifid in summit. Between these angles, throughout their extent, the surface has very fine longitudinal riblets; and not far from the apex a secondary rib arises in each of the four faces, and continues as far as the primary ribs. The larger moiety of the shell is polished, cylindrical, wholly free from longitudinal sculpture. Growth striae fine and inconspicuous.

Aperture slightly oblique, subcircular, the peristome thin; anal orifice square with thin walls, and without slit or notch.
Length 30, antero-posterior diam. of aperture 3 mill., lateral 3,2 mill. (P. & SH.).

Distribution. Singapore (SOWERBY S. ARCHER) Samar, Philippines (SOWB.) China Sea. Darnley I. Torres Straits 30 fms (Chevert Exp.).

Remarks. The single specimen obtained by the Siboga has a length of 32 mill. with a greatest diameter of 3,5 mill. The shell is rather transparent with many opaque bands. At a distance of less than 10 mill. from the apex, the shell is smooth. There is a small wedgelike notch at the apex, bordered by a slight rim, indicating the existence of a supplemental tube.

47. *Dentalium dipsycha* Pilsbry & Sharp. Pl. II, figs 24, 25.

1897. *Dentalium dipsycha* Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 33, pl. 4, fig. 57—60.

Stat. 174. Waru bay, North coast of Ceram. 18 Metres. Mud. 1 Spec.

Diagnosis. Shell slender, the length about 11 times the diam., well curved, attenuated toward the apex; white, nearly lusterless. Sculpture: at and near the apex square in section, with four acute, narrow, projecting, longitudinal pinched-up ribs, the spaces between flat; not far from the apex in each face a median thread arises, and soon equals the primary four in size; each interval then bears a tertiary thread, and here the section of the tube has become circular. At about the middle of the length another set of interstitial threads appear; so that at the aperture there are 32 flat, equal, low, but abruptly defined riblets, separated by flat interstices of about the same or slightly greater width. Interstices everywhere plain, except for circular growth-lines, which are moderately obvious throughout.

Aperture rounded, somewhat compressed antero-posteriorly, the inner margin less curved; hardly oblique; peristome thin. Anal orifice circular, occupying a very short tube. No slit.
Length 45, antero-posterior diam. of aperture 3,8, lateral diam. 4,1 mill. (P. & SH.).

Distribution hitherto unknown.

Remarks. This species differs from *D. dispar* in the simple primary ribs, lack of fine even longitudinal striation, and persistance of the sculpture to the aperture. *D. quadrapicale* is allied, but has a much more oblique aperture, more rapidly tapering tube, and though far smaller, a greater number of much finer longitudinal riblets. (P. & Sh.).

The specimen obtained by the Siboga is not full-grown but it offers all the characters of *D. dipsycha*. It measures 23 mill., with a greatest diameter of 2 mill. and is much attenuated. At the aperture there are 16 riblets, the last set of interstitial riblets having not yet appeared. The four primary ribs though acute near the apex, become rapidly rounded, together with the other ribs. They remain however very narrow.

*48. *Dentalium quadricostatum* Brazier.

1877. *Dentalium quadricostatum* Brazier, Proc. Linn. Soc. N. S. Wales II, p. 58.
1897. *Dentalium quadricostatum* Brazier. Pilsbry & Sharp, Man. of Conch. vol. XVII, p. 33.

Diagnosis. Shell white, very slightly arched, four angled, keel or rib at each angle, rounded, finely serrated, interstices flat, marked with transverse lines; apex perforated, perforation entire; aperture angled. Length 16 mill., diam. of base 2 mill. (Brazier).

Distribution. Princess Charlotte Bay, North East Australia, 13 fms. York Island, Torres Straits, 13 fms. Katow, New Guinea 8 fms (Chevert Exp.).

Remarks. If this species is laid upon its side it forms a true square; when resting with the arched part of the apex down, it forms four angles, with a serrated rib on each angle. The 11 specimens from Katow, 16 from Princess Charlotte Bay, and 1 from York Island, all have the same character. (Brazier).

49. *Dentalium tetrapleurum* n. sp. Pl. VI, fig. 37.

Stat. 4. 7°42′ S., 114° 12′.6 E. Anchorage off Djankar (Java). 9 Metres. Coarse sand. 1 Spec.
Stat. 279. Ruma-Kuda bay, Roma Island. 36 Metres. Mud and sand. 1 Spec.

Diagnosis. Shell moderately curved, white, rather stout, square at the apex, rounded at the aperture. Sculpture: four primary ribs at apex, soon followed by secondary and tertiary ribs, giving a total number of 16 equally strong, rounded longitudinal ribs near the aperture. Intervals concave and longitudinally striated throughout their extent. About 20 fine microscopical striae in each undivided interval at the apex. Tube subcircular, a very little laterally compressed. Aperture not very oblique. Anal orifice round, with a slight rim, the ribs not slit.

Length 22, greatest diameter 3 mill.

Remarks. The specimens obtained by the Siboga are not yet full-grown. Probably an older individual would show one more set of interstitial striae, as in *D. dipsycha*. Is the general system of sculpture in both species the same, still they can easily be distinguished by the inter-

stitial striation, which lacks in *D. dipsycha* and by the greater rate of increase of *D. tetrapleurum* which is altogether a more robust shell.

The South American *D. quadrangulare* agrees with *tetrapleurum* in having longitudinally striated interstices. Here however no secondary and tertiary riblets appear, while its rate of increase is still greater than in our species.

50. *Dentalium quadrapicale* Hanley. Pl. I, fig. 13.

1860. *Dentalium quadrapicale* Hanley MS. Sowerby, Thes. Conch. III, p. 103, pl. 225, fig. 61.
1872. *Dentalium quadrapicale* Hanley, Conch. Icon. pl. 7, fig. 46.
? *Dentalium quadrapicale* Hanley. CLESSIN, Conch. Cab. p. 13.
1897. *Dentalium quadrapicale* Hanley. PILSBRY & SHARP, Manual of Conch., vol. XVII, p. 34, pl. 4, fig. 50.

Stat. 51. Madura bay and other localities in the southern part of Molo Strait. 1 Spec.

Diagnosis. Shell rather stout, apical third strongly curved, the remainder but slightly arcuate; white, shining. Sculpture: four angles at the apex (giving that part an almost square section, the two outer sides of the square slightly longer), situated at the outer, inner and lateral surfaces, the faces between them straight and flat; these angles rapidly lose in prominence, and the intervals become convex; very near the apex each interval becomes parted by a secondary riblet; and the interstices between these are again divided by tertiary threads at about the end of the first third of the shell's length; and subdivision proceeds until at the aperture there are about 36 low, subequal riblets, with narrow, shallow intervals, and the tube is subcircular, a little flattened antero-posteriorly, in section. Growth striae faint. Aperture very oblique. Anal orifice without slit or notch.
Length 20, length of aperture, measured obliquely $3^1/_3$, breadth 3 mill.
Length 31,5 mill. (original fig.) (P. & SH.).
Length 40 mill. (reported by E. A. SMITH).

Distribution. Cochin; Malabar (HANLEY Coll.). Coast of Travancore. 406 fms (Investigator); Gulf of Oman (MELV. & STANDEN).

The following is probably a description of an old specimen of *D. quadrapicale* Hanley.

Dentalium conspicuum Melvill. Pl. II, fig. 26.

1897. *Dentalium conspicuum* Melvill., Mém. and Proc. Manchester Lit. and Phil. Soc., XII, pt 3, p. 21, pl. 7, fig. 28.
1897. *Dentalium conspicuum* Melvill. PILSBRY & SHARP, Man. of Conch. vol. XVII, p. 248, pl. 33, fig. 60.

Shell shining, subulate, arcuate, milk-white, longitudinally delicately striated, the striae unequal, here thin and there thicker, spirally irregularly concentrically encircled by lirae; at the apex octagonal, toward base vanishing, the base itself very smooth, rotund.
Length $1^3/_4$, diam. $^3/_{16}$ inch. (MELV.).

Karachi.

A milk-white, conspicuous species, slightly arcuate, eight angled at the apex, the longitudinal striae very unequal down the body of the shell, and entirely vanishing before the base, which is very smooth and round at the orifice. It is concentrically unequally lirate; two specimens (Melv.).

I have compared the types in the British Museum and find them less tapering than *quadrapicale*, while with the same length they have a greater diameter than in that species. The apex is very wide having in one specimen a diameter of 1,5 in another of 2 mill. which makes it very probable that the more attenuated foursided apex of the young shell has been replaced by the octagonal part of the older shell.

Subgenus **Antalis** H. & A. Adams 1854.

1847. *Entalis* Gray, P. Z. S. p. 158. Not *Entalis* Sowerby 1839 = *Pyrgopolon* Montf. 1810.
1854. *Antalis* H. & A. Adams, Gen. Proc. Moll. I, p. 457.
1894. *Entaliopsis* Newton & Harris, Proc. Malac. Soc. Lond. I, p. 66.
1897. *Antalis* H. & A. Adams. Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 37.

Shell circular or polygonal in section, sculptured with longitudinal ribs or striae at least in the young, often without longitudinal sculpture in adults, or only so sculptured near the apex; apex generally with a *V*-shaped notch at or near the convex side, or with a solid plug and central short tube or orifice. Type *D. entalis* Linn. (P. & Sh.).

I have entered here a description of *D. entalis* L. though the common form of that arctic species does not occur in the Indopacific province. I have distinguished the single specimen obtained at Stat 159 as an Indian variety as it could hardly be separated from *entalis*, differing only in some minor points.

*51. *Dentalium entalis* Linné. Pl. VI, figs 13, 14.

1758. *Dentalium entalis* Linné, Syst. Nat. (10), p. 785; (12), p. 1263.
1777. *Dentalium entalis* Linné. Pennant, Brit. Zool. IV, p. 145, pl. 90, fig. 154.
1818. *Dentalium entalis* Linné. Lamarck, An. s. Vert. V, p. 345.
1842. *Dentalium entalis* Linné. Reeve, Conch. syst. II, p. 6, pl. 130, fig. 3.
1853. *Dentalium entalis* Linné. Forbes & Hanley, Nat. Hist. Brit. Moll. II, p. 449, pl. 57, fig. 11.
1865. *Dentalium entalis* Linné. Jeffreys, Brit. Conch. III, p. 191, pl. 5, fig. 1; V, fig. 55, fig. 1.
1873. *Dentalium entalis* Linné. Sowerby, Conch. Icon. XVIII, pl. VI, fig. 40.
1882. *Dentalium entalis* Linné. Jeffreys, P. Z. S., p. 659.
1885. *Dentalium entalis* Linné. Watson, Chall. Scaph. p. 5.
1897. *Dentalium entalis* Linné. Pilsbry & Sharp, Man. of Conch. XVII, p. 42, pl. 8, fig. 25.
Dentalium striolatum Stimpson, Proc. Bost. Soc. Nat. Hist. IV, p. 114 (1851).
Not *D. striolatum* Jeffreys, Watson or Sars.
Not *D. striolatum* Risso (1826).

Diagnosis. Shell tapering, not much curved, often irregularly divided into segments by the successive accretions of growth; it is solid, opaque and glossy. Sculpture; slight concentric lines of growth, and occasionally a few indistinct and extremely fine longitudinal striae towards the narrower end, these striae, when they occur, are not very numerous, and are only visible with the aid of a magnifier; color ivory-white, with sometimes an ochreous stain on the narrower part, caused by an admixture of mud with the sand in which this species burrows: margin at

the anterior or broader end more or less jagged, owing to that part of the shell being newly formed and consequently much thinner than other parts; at the posterior or narrower end it is usually truncated in adult specimens, and furnished with a very short sloping and oblique pipe or tubular appendage having a pear-shaped orifice; there is also occasionally at the point on the convex side a notch or groove, in a line with the front or smaller part of the tubular appendage, and this notch is rarely extended into a short and narrow slit or channel.
Length 37—42, diam. of aperture 4,5—5 mill.

Distribution. Spitzbergen, Scandinavia, Iceland, and atlantic coasts of Europe, south to Spain, 3—1750 fms. Coasts of Maine and Massachusetts north to Bay of Fundy.

Var. *indicum* n. var. Pl. VI, fig. 15.

Stat. 159. 0° 59'.1 S., 129° 48'.8 E. 411 Metres. Coarse sand. 1 spec.

Very similar to *D. entalis* but more slender, very glossy and entirely without longitudinal sculpture. Apical notch on the convex side rather deep and extending into a very short (0,04 mill.) slit. Tubular appendage very long (1,4 mill) slightly laterally compressed. Anterior aperture very little oblique, dorso-ventrally compressed.
Length 26, lateral diam. of apert. 3,8, dorso-ventral diam. of apert. 3,4 mill.

Subgenus **Graptacme** Pilsbry & Sharp 1897.

1897. *Graptacme* Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 85.

Surface sculptured with close, fine, deeply engraved longitudinal striae near the apex, the remainder smooth; or rarely the striae persist half or all the length. Moderate sized or small species, cylindrical in section, and white or nearly so. (P. & Sh.).

D. usitatum is new to this group and bigger than the majority belonging to it.

The group is distributed over Antillean, Panamic and Indopacific regions.

Key to species.

Striae covering one seventh and less of shell; length 30—40 mill., about 12—14 times the diam. . . . . *aciculum.*

Striae covering more than one seventh of the shell;

a. Length 45—65 mill., about 9—11 times the diam. . . . . *usitatum.*

b. Length 40—50 mill., about 20 times the diam. . . . . *acutissimum.*

52. *Dentalium usitatum* E. A. Smith. Pl. V, figs 6, 7, 8.

1894. *Dentalium usitatum* Smith, Ann. & Mag. Nat. Hist. (6), XIV, p. 168, pl. 4, fig. 16, 16*a*.
1897. *Dentalium usitatum* Smith. Pilsbry & Sharp, Manual of Conch., vol. XVII, p. 29, pl. 10, figs. 68, 69.

Stat. 88. 0° 34'.6 N., 119° 8'.5 E. Celebes Sea. 1301 Metres. Fine grey mud. 6 Spec.
Stat. 211. 5° 40'.7 S., 120° 45'.5 E. Banda Sea. 1158 Metres. Coarse grey mud. 3 Spec.
Stat. 300. 10° 48'.6 S., 123° 23'.1 E. Timor Sea. 918 Metres. Fine grey mud. 2 Spec.

Diagnosis. A beautiful big white shell, well curved, tapering. Sculpture: 20—35 fine riblets at apex, separated by wider intervals. Intervals flat and shallow, microscopically longitudinally striated, seen under a strong lens. Longitudinal sculpture very distinct for about one fourth to one third the shell's length (in young specimens four about the half) losing anteriorly in prominence but remaining superficially visible over some length. Anterior half or third of the shell quite smooth, brilliant white, with oblique growth striae only. Apex often entire, but also with a slit; anterior aperture circular, thin edged, generally oblique, parallel to the growth lines.
Length 65 mill., diam. of aperture 7 mill.
Length 51 mill., diam. of aperture 5 mill.
Length 50 mill., diam. of aperture 4,5 mill.
Length 45 mill., diam. of aperture 4 mill.

Distribution. Off Colombo, Ceylon in 675 fms; Bay of Bengal in 597 fms. (Investigator).

Remarks. The specimens obtained by the Investigator and described by Mr E. A. Smith were only the apical parts of the shell. Afterwards entire specimens were brought to the British Museum which have been identified with *usitatum* by Mr E. A. Smith. The Siboga specimens proved on comparison to be the same. Of those, four have a well-developed slit measuring in one 3 mill.; the others have the apex entire.

53. *Dentalium acutissimum* Watson. Pl. II, fig. 39. Pl. V, figs 9, 10, 11, 12.

1879. *Dentalium acutissimum* Watson, Journ. Linn. Soc. Lond., vol. XIV.
1886. *Dentalium acutissimum* Watson, Challenger Report, p. 8, pl. 1, fig. 8.
1897. *Dentalium acutissimum* Watson. Pilsbry & Sharp, Man. of Conch. vol. XVII, p. 94, pl. 20, fig. 26.

Stat. 88. 0° 34′.6 N., 119° 8′.5 E. Celebes Sea. 1301 Metres. Fine grey mud. 12 Spec.
Stat. 211. 5° 40′.7 S., 120° 45′.5 E. Banda Sea. 1158 Metres. Coarse grey mud. 4 Spec.
Stat. 300. 10° 48′.6 S., 123° 23′.1 E. Timor Sea. 918 Metres. Fine grey mud. 2 Spec.

Diagnosis. Shell long and much attenuated, rather straight and very regularly curved, very thin, brilliant and glassy. Sculpture: The surface is crossed by fine, sharpish, irregular striae, which run very elliptically round. In the young shell the surface is regularly and finely scratched by a great number of close-set, regular, sharp and extremely minute lines, which very gradually become more and more faint, but are still traceable even in the full-grown shell. The color is pure white, transparent, and almost hyaline in the fresh shell, but in the dead shell the interior (not, as usual, the exterior) layers of the shell become opaque and chalky. The edge is very thin and irregularly broken. At the apex the end is abruptly broken off in one specimen, and in the other there is an irregular fissure with an internal lining process. In one specimen from Station 246, which is full-grown, but very short, a large, thin, irregularly shaped process projects, which, being obliquely cut off somewhat across the shell, supplies the anal orifice.
Length 1,52 inch, of young specimen from Station 218; breadth at mouth 0,12, at apex 0,026 inch. Length 1,14 of old and broken specimen, Station 246; breadth at mouth 0,23, at apex 0,14 inch. (Watson).

Distribution. North of Papua 1070 fms; mid-Pacific E. of Japan, 2050 fms. (Challenger).

Remarks. This shell is rather like *D. usitatum*, but is more slender and more attenuated. The number of the riblets near the apex varies between 40 and 45. It is rather curious that it occurred at exactly the same stations as *usitatum*.

Here follow the measurements:

a. Length 51,5 mill., diam. of aperture 2,8 mill.
b. Length 50 mill., diam. of aperture 2,5 mill.
c. Length 50 mill., diam. of aperture 3,2 mill.
d. Length 45 mill., diam. of aperture 3 mill.

54. *Dentalium aciculum* Gould. Pl. II, fig. 36. Pl. V, figs 13, 14.

1859. *Dentalium aciculum* Gould, Proc. Bost. Soc. N. H. VII, p. 165.
? *Dentalium aciculum* Gould, Otia Conch., p. 119.
1872. *Dentalium aciculum* Gould. SOWERBY, Conch. Icon. XVIII, pl. 7, fig. 52.
1897. *Dentalium aciculum* Gould. PILSBRY & SHARP, Man. of Conch., vol. XVII, p. 7, fig. 52.

Stat. 52. 9° 3'.4 S., 119° 56'.7 E. Sumba Sea. 959 Metres. Globigerina ooze. 1 Spec.
Stat. 133. Anchorage off Lirung, Salibabu-island. Up to 36 Metres. 4 Spec.

Diagnosis. Shell slender, considerably tapering, attenuated posteriorly, moderately curved throughout but more toward the apex; glossy white, nearly opaque. Sculpture of fine, close, deeply engraved longitudinal striae near the apex (extending over only a seventh the total length in the type specimen), the remainder of the shell smooth and polished, with faint growth striae only. Aperture circular, a trifle oblique. Anal orifice with a slight notch on the convex side and a concave wave on the opposite part. Length 24, diam. at aperture 2,55, at apex 0,6 mill. (P. & SH.).

Distribution. Coast of China 23° 50' N. lat., in 25 fms.

Remarks. The two Siboga-specimens obtained at different stations, are both longer than the type. The measurements are:

a. Length 41 mill., diam. of apert. 2,8 mill.
b. Length 41 mill., diam. of apert. 3 mill.

There are moreover two specimens in the Museum of Amsterdam, also bigger than the type and measuring:

a. Length 40,5 mill., diam. of apert. 3,2 mill.
b. Length 35 mill., diam. of apert. 2,6 mill.

All have a slight notch on the outer and a concave wave on the inner curve. The specimen of Stat. 133 has also a slight indication of a supplemental tube.

Subgenus **Episiphon** Pilsbry & Sharp 1897.

Episiphon Pilsbry & Sharp, Manual of Conchology, vol. XVII, p. 117.

Small, very slender, rather straight shells, needle-shaped or truncated, slightly tapering,

thin and fragile, glossy and smooth, or at least without longitudinal sculpture; apex with a projecting pipe or a simple orifice; no slit, rarely a notch.

Inhabitants of moderately or very deep water in the Mediterranean, Atlantic, Gulf of Mexico and Pacific.

The small accessory tube or pipe at the apex is frequently developed in most, perhaps all, of the species grouped here; although most young and many adult shells lack it. (P. & Sh.).

The subgenus *Episiphon* consisted hitherto of 7 species of which *D. subrectum* Jeffreys only habitated the Indo pacific province. Most of the species are rather hard to distinguish, the differences being principally based on highly variable characters, as size, rate of increase, curvature and colour. Young specimens are often very different from adults of the same species, as is proved by *D. carneum* of which one specimen measuring 18,5 mill. has a greatest diam. of 1,4 mill. while a much younger individual measuring 15,5 mill., has a greatest diam. of 0,8 mill. It is therefore often practically impossible to draw conclusions about the species, if the material is not large enough.

Key to Species.

a. Shell whitish or delicately salmon-tinted . . . . . *subrectum*.
b. Shell deeply flesh-coloured . . . . . *carneum*.

55. *Dentalium subrectum* Linné. Pl. VI, figs 46—50.

1882. *Dentalium subrectum* Jeffreys, Proc. Zool. Soc. p. 661 (see under *D. filum*).
1897. *Dentalium subrectum* Jeffreys. Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 119, pl. 18, fig. 5.
Dentalium subrectum Sowerby in part. (those reported from the Philippines) Conch. Icon., pl. 5, fig. 31 (not fig. 32!) 1860.

Stat. 4. Anchorage off Djankar (Java) 7°42′.6 S., 114°12′.6 E. 9 Metres. Coarse sand. 1 Spec.

Diagnosis. Shell acicular or needle-shaped, thin, extremely slender, tapering almost to a point, nearly straight, translucent whitish, with the faintest reddish tint from the middle to the apex. Surface very glossy, smooth, with faint growth striae only. Aperture not oblique, circular. Anal orifice minute, circular, with thin, entire edge. Length 16, diam. of aperture 1 mill.

Distribution. Philippines (Cuming); Batavia (Prof. Sluiter).

Remarks. A young specimen was obtained by the Siboga. It is much acuminated and with a length of 16 mill. has a greatest diam. of 1 mill. There are moreover several specimens brought by Prof. Sluiter from Batavia. I have identified them with *subrectum*, and hold them for older than Jeffreys' types. Here follows a more exact description of Sluiter's specimens: Shell narrow, slender, cylindrical, moderately curved, acuminated in young, truncated in adults; quite smooth, with hardly perceptible growth striae; colour whitish, very delicately salmon-tinted, especially near the shell's middle, with some opaque white bands. Apex attenuated and simple or truncated with very thick walls and a small supplemental tube. Anterior aperture rounded, sometimes a little oblique.

Length 21 mill., diam. of apert. 1,6 mill., of apex 1,2 mill.
Length 22 mill., diam. of apert. 1,6 mill., of apex 0,2 mill.
Length 16,2 mill., diam. of apert. 1,5 mill., of apex 1,2 mill.
Length 16 mill., diam. of apert. 1,1 mill., of apex 0,4 mill.

56. *Dentalium carneum* n. sp. Pl. VI, figs 42—45.

Stat. 45. 7° 24′ S., 118° 15′.2 E. Flores Sea. 794 Metres. Fine grey mud. 15 Spec.
Stat. 300. 10° 48′.6 S., 123° 23′.1 E. Timor Sea. 918 Metres. Fine grey mud. 1 Spec.
Stat. 181. Ambon. Mud, sand and coral. 54 Metres. 2 Spec.

Diagnosis. Shell more slender than *subrectum*, and more curved, cylindrical. Reddish brown or salmon coloured, becoming a little lighter coloured toward the anterior aperture; often with some opaque white bands. Apex truncated, with a small supplemental tube; the young very acicular.

Length 22,5 mill., diam. of apert. 1,3 mill., of apex 0,6 mill.
Length 20,5 mill., diam. of apert. 1,4 mill., of apex 0,5 mill.
Length 18,5 mill., diam. of apert. 1,4 mill., of apex 0,6 mill.

Measurements of very young individual:

Length 15,5 mill., diam. of apert. 0,8 mill., of apex 0,08 mill.

Remarks. This species greatly resembles *subrectum* but is rather more curved, decidedly more slender, and more deeply coloured. None of the specimens examined are as broadly truncated as some of the specimens brought by Mr Sluiter of *subrectum*, the diameter of the apex exceeding nowhere 0,6 mill.

It is also very like the Panamic *D. innumerabile* P. & Sh. but is distinguished from that species, by being cylindrical, while *innumerabile* is laterally compressed and proportionally broader.

Subgenus **Bathoxiphus** Pilsbry & Sharp 1897.

Bathoxiphus Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 121. Type *D. ensiculus* Jeffreys.

Shell thin, conspicuously compressed laterally, nearly or quite smooth, with a broad slit on the convex side of apex. (P. & Sh.).

57. *Dentalium tricarinatum* n. sp. Pl. VI, figs 40, 41.

Stat. 178. 2° 40′ S., 128° 37′.5 E. Ceram Sea. 835 Metres. Blue mud. 3 Spec.
Stat. 208. 5° 39′ S., 122° 12′ E. Banda Sea. 1886 Metres. Solid green mud. 1 Spec.
Stat. 211. 5° 40′.7 S., 120° 45′.5 E. Banda Sea. 1158 Metres. Coarse grey mud, superficial layer more liquid and brown. 1 Spec.
Stat. 300. 10° 48′.6 S., 123° 23′.1 E. Timor Sea. 918 Metres. Fine grey mud. 2 Spec.

Diagnosis. Shell considerably curved, strongly laterally compressed, forming thus a narrow arch on the outer, and a sharp keel on the inner curve. Besides these there are two lateral longitudinal keels or ribs, running closer to the concave side. Arch and keels sharp at and near apex, becoming blunter toward the anterior aperture. Colour white, porcellanous, with

numerous close growth striae, also visible on the ribs. Apex with a wide deep slit totally cutting away the convex side of the apex over a varying distance of 0,5 to 1,5 mill. Margin on the convex side thin-edged on the concave side thick-edged. Anterior aperture keeled on the inner and narrowly arched on the outer margin, not oblique.

a. Length 21,5 mill., diameter of apert. 2,5 × 1,6 mill.
b. Length 19 mill., diameter of apert. 2,2 × 1,5 mill.
c. Length 15 mill., diameter of apert. 2,2 × 1,5 mill.

Fig. 23. Anterior aperture of *D. tricarinatum*.

First is given the antero-posterior, then the lateral diameter, measured between the lateral keels.

Remarks. This form brings a second species into the subgenus *Bathoxiphus*. The only hitherto known species of that subgenus, *D. ensiculus* Jeffreys is distributed over the eastern and western Atlantic, Gulf of Mexico and the West-Indies. Both species are nearly allied, but *tricarinatum* is shorter and more curved, has two prominent lateral keels and the slit is less long than in *ensiculus*.

Subgenus **Gadilina** Foresti 1895.

1895. *Gadilina* Foresti, Bull. della Soc. Mal. Italiana XIX, p. 259.
1897. *Gadilina* Foresti. SACCO, I Molluschi del Piemonte e della Liguria, Parte XXII, p. 113.
1897. *Gadilina* Foresti. PILSBRY & SHARP, Man. of Conch., vol. XVII, p. XXXII.

Shell smooth and slender, triangular or faintly triangular in section; the concave side flattened, the convex side rounded. Type *D. triquetrum* Brocchi.

This group was ranked as a subgenus of *Siphonodentalium*, but examination of the living animal brought to light that it belongs to the Dentalidae, the foot having the regular epodial sheath of species belonging to that family.

Key to Species.

I. Shell decidedly trigonal.
  a. The angles strongly accentuated . . . . . *stapes*.
  a'. The angles more rounded. . . . . *insolitum*.

II. Shell cylindrical or faintly trigonal.
  a. Shell very slender and attenuated . . . . . *pachypleurum*.
  a'. Apex strongly truncated . . . . . *truncatum*.

58. *Dentalium insolitum* E. A. Smith. Pl. V, fig. 15. Pl. VI, figs 80, 82, 84.

1894. *Dentalium insolitum* E. A. Smith, Ann. Mag. Nat. Hist. (6) XIV, p. 168, pl. 4, fig. 17, 17*a*.
1897. *Dentalium insolitum* E. A. Smith. PILSBRY & SHARP, Man. of Conch., vol. XVII, p. 109, pl. 22, figs 56, 57.

Stat. 45. 7° 24′ S., 118° 15′.2 E. Flores Sea. 794 Metres. Fine grey mud, with some Radiolariae and diatomes. 1 Spec.
Stat. 52. 9° 3′.4 S., 119° 56′.7 E. Sumba Sea. 959 Metres. Globigerina ooze. 3 Spec.

Stat. 95. 5° 43′.5 N., 119° 40′ E. Sulu Archipelago. 522 Metres. Stony bottom. 1 Fragment.
Stat. 178. 2° 40′ S., 128° 37′.5 E. Ceram Sea. 835 Metres. Blue mud. 2 Spec.
Stat. 300. 10° 48′.6 S., 123° 23′.1 E. Timor Sea. 918 Metres. Fine grey mud. ± 23 spec.

Diagnosis. Shell smooth, slender, rather strongly curved, threesided, flattened on the inner, rounded on the outer curve. The inner or convex side is defined by lateral angles, rather sharp near the apex but becoming anteriorly more rounded. Apex with a wide shallow notch and a tubular (in some specimens rather long) appendage. Sometimes the tube is also notched. Great many specimens have the apex broken and it is then visible on the section that the inner margin is thickened, while the outer margin is thin edged. They enclose a round opening. Anterior aperture trigonal, with rounded corners. Shell brilliantly white, transparent in live state, porcellanous when dead. Many superficial growth striae with here and there a deeper circular line.
Length 46 mill., diam. at aperture measured along the inner margin 3 mill.

Fig. 24. Section near the apex of *D. insolitum*.

Distribution. Bay of Bengal in 597 fms. (Investigator).

Remarks. This shell is nearly allied to the fossil *Gadilina triquetra* Br. of the lower Miocene of Piedmont (Sacco, I Moll. del. Piem. e delle Lig. Pt. XXII, p. 113, Tav. X, figs 35—43) and to *Dentalium trigonale* K. Martin (Samml. Geol. Reichsmus. Leiden, 1te Serie, Bd III, 1883—87, Tab. X, Fig. 192) of the Java Tertiary.

The Siboga-specimens show the characters of *D. insolitum* rather strongly accentuated, but after comparison with the types in the British Museum, I find the difference to be too small, to justify a separation. *Gadilina triquetra* Br. obligingly sent to me by Prof. Sacco from the Museum of Torino seems to be an intermediate form between *insolitum* and *stapes*.

59. *Dentalium stapes* n. sp. Pl. V, figs 16—20. Pl. VI, figs 79, 81, 83.

Stat. 212. 5° 54′.5 S., 120° 19′.2 E. Banda Sea. 462 Metres. Fine grey and green mud. ± 35 Spec.

Diagnosis. Shell moderately curved, finely tapering, threesided, sharply keeled on the convex, flattened on the concave side. Keel on the outer curve high and narrow, with flat lateral walls; wall on the inner curve (seen on a transverse section) very faintly convex and sometimes slightly sunken between the protruding lateral angles (at least near the apex). Toward the anterior aperture the keel and angles become blunter, the surface of the sides more convex, but the trigonal form remains clearly noticeable to the end. Apex extremely attenuated, very slightly notched, and sometimes with a supplemental tube. In some much attenuated specimens the apex is microscopically, longitudinally striated. The top has the shape of a horse-shoe, the anal orifice being pear- or egg-shaped, while the inner margin is flat and thick-edged, the outer margin arched and thin-edged. Anterior aperture decidedly trigonal. Minute growth striae, close and superficial with some deeply incised lines.
Length 47 mill., diam. of aperture, measured along the inner margin, 2,1 mill.
Length 44 mill., diam. of aperture, measured as above 2,4 mill.

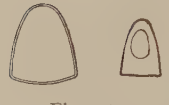


Fig. 25. Anterior aperture and section near the apex of *D. stapes*.

Remarks. *D. insolitum* and *stapes* are nearly allied. Anteriorly the shells are much

alike and fragments of both species, showing only the anterior parts, could easily be mistaken for each other. Posteriorly however the difference is marked. In *stapes* the longitudinal angles are much sharper, the arch on the convex side is narrower, and higher in proportion to the flat face than in *insolitum*, while the sides are less convex. Also in *stapes* the rate of increase is smaller than in *insolitum*.

60. *Dentalium pachypleurum* n. sp. Pl. V, figs 21, 22.

Stat. 208. 5° 39′ S., 122° 12′ E. Banda Sea. 1886 Metres. Solid green mud. 2 Spec.
Stat. 271. 5° 46′.7 S., 134° 0′ E. Arafura Sea. 1788 Metres. Bluish green mud of a uniform appearance. 1 Spec.

Diagnosis. Shell very slender, moderately curved, smooth, white and brilliant, without longitudinal sculpture; cylindrical, but the convex side is very slightly laterally compressed reminding one of forms like *stapes* and *insolitum*. A transverse section near the apex shows that the wall on the concave curve is thickened, which is also the case in the preceding species; there is however not the faintest trace of longitudinal angularity. Apex thick-edged with a supplemental tube. Growth striae hardly noticeable. Anterior aperture subcircular, thin-edged.

Fig. 26. Section near the apex of *D. pachypleurum*.

Length 46 mill., greatest diam. 2,4 mill.
Length 36 mill., greatest diam. 1,9 mill.

61. *Dentalium truncatum* n. sp. Pl. VI, fig. 33.

Stat. 90. 1° 17′.5 N., 118° 53′ E. Celebes Sea. 281 Metres. Coral sand and stones. 1 Spec.
Stat. 256. 5° 26′.6 S., 132° 32′.5 E. Arafura Sea. 397 Metres. Greyish green mud. 2 Spec.

Diagnosis. Shell slightly but evenly curved, cylindrical or faintly trigonally compressed in the way of *insolitum*. White and brilliant, nearly smooth but for some deeply incised wrinkles near the apex. Apex faintly trigonal, strongly truncated, thick-edged with a minute orifice and a short supplemental tube. Anterior aperture subcircular, thin-edged, a little oblique.

Fig. 27. Apex of *D. truncatum*.

Length 18 mill., diam. of anterior apert. 1,5 of apex 1,4 mill.
Length 16 mill., diam. of anterior apert. 1,6 of apex 1,1 mill.
Length 23 mill., diam. of anterior apert. 2,3 of apex 1,4 mill.

Remarks. All the specimens show deep irregular fissures where the shell after breakage has been repaired. The concentric lines near the apex remind one of the group of *D. tracheatum*. The specimen of Stat. 90 has them over its whole surface while the others are anteriorly quite smooth with superficial growth striae only.

Subgenus **Laevidentalium** Cossmann 1888.

1888. *Laevidentalium* Cossmann, Ann. de la Soc. Roy. Malac. de Belgique, XXIII, p. 9.
1897. *Laevidentalium* Cossmann. Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 97.

Shell of moderate or large size, smooth, with growth lines only, circular or slightly oval in section; apex simple (typically), or with a short notch on the convex side as in *Antalis*. (P. & Sh.).

Key to Species.

I. Shell with numerous unequal annular swellings . . . . . *eburneum.*
II. Shell strongly curved. Length 90 mill., about 19 times the diam. . . . *longitrorsum.*
III. Shell moderately curved.
a. Apex entire, simple. Length 30 mill., 12 times the diam. . . . . *lacteum.*
b. Apex thickened. Length 40—45 mill., 13—14 times the diam. . . . *banale.*
c. Apex with a notch on the convex side and a smaller one on the concave side. Length 33,5 about 11 times the diam. . . . . *bisinuatum.*

*62. *Dentalium longitrorsum* Reeve. Pl. II, fig. 33, 33*a*.

1842. *Dentalium longitrorsum* Reeve, P. Z. S. 1842, p. 197.
? *Dentalium longitrorsum* Reeve, Conch. Syst. II, p. 6, pl. 130, fig. 6.
1860. *Dentalium longitrorsum* Reeve. SOWERBY, Thes. Conch. III, p. 98, pl. 225, figs 59, 60.
1872. *Dentalium longitrorsum* Reeve, Conch. Icon. XVIII, pl. 2, figs 9*a*, *b*.
1877. *Dentalium longitrorsum* Reeve. BRAZIER, Proc. Linn. Soc. N. S. Wales, II, p. 59.
1879. *Dentalium longitrorsum* Reeve. WATSON, Journ. Linn. Soc. Lond., XIV, p. 515.
1885. *Dentalium longitrorsum* Reeve. WATSON, Challenger Scaph.
1893. *Dentalium longitrorsum* Reeve. COOKE, Ann. Mag. N. H. (5), XVI, p. 271.
1897. *Dentalium longitrorsum* Reeve. PILSBRY & SHARP, Man. of Conch., vol. XVII, p. 111, pl. 20, figs 35, 36.
? *Dentalium lamarckii* Chenu, Illustr. Conch. I, Dent., p. 5, pl. 6, figs 15, 15*a*.
? *Dentalium longitrorsum* Paetel. Catalog I, p. 593.

Diagnosis. Shell much and evenly curved, very long and slender, the length (of chord) about 19 times the greatest diameter; thin, but solid, polished, amber or carnelian colored or tinted, or pure white. Sculpture none, save inconspicuous growth lines. Aperture circular, the peristome thin. Anal orifice circular, entire or ovate, and with a slight notch slightly aside from the middle on the convex side.
Length 89, diam. of aperture 4,7, height of arch from chord 16 mill. (From PILSBRY).

Distribution. Darnley Island, Torres Straits 30 fms, sandy mud (Chevert Exp.); west of Cape York, south-west of Papua, 25 fms (Challenger Exp.); Bombay (MELV. & ABERCOMBRE); Gulf of Suez (MAC-ANDREW); Philippines (SOWERBY; Philad. Acad. coll.; Zool. Mus. of Amsterdam); Zanzibar & China (Brit. Mus.).

Remarks. The biggest specimen at the Zool. Mus. of Amsterdam has a length of 85 with a greatest diam. of 5 mill. It is light yellow with some darker bands.

63. *Dentalium eburneum* Linné. Pl. II, fig. 31. Pl. IV, figs 10, 11.

1767. *Dentalium eburneum* Linné, Syst. Nat. (12), p. 1264.
1818. *Dentalium eburneum* Linné. LAMARCK, An. s. Vert. V, p. 346.
1860. *Dentalium eburneum* Linné. SOWERBY, Thes. Conch. III, p. 98, pl. 225, fig. 53.
1872. *Dentalium eburneum* Linné, Conch. Icon. XVIII, pl 3, fig. 16.
1897. *Dentalium eburneum* Linné. PILSBRY & SHARP, Man. of Conch., vol. XVII, p. 115. pl. 20, figs 33, 34.

1897. *Dentalium indicum* Chenu, Illustr. Conchyl. I, Dentalium p. 4, pl. 3, fig. 11.
? *Dentalium novaehollandiae* Chenu Illustr. conchyl. I, p. 5, pl. 6, fig. 14.
1860. *Dentalium Philippinarum* Sowerby, Thes. Conch. III, p. 98, pl. 225, fig. 54.
1872. *Dentalium Philippinarum* Reeve's Conch. Icon. XVIII, pl. 3, fig. 18.
Not *Dentalium eburneum* Deshayes Mem. Soc. Hist. Nat. Paris 1825 = *D. politum* Linné.

Stat. 4. Anchorage off Djankar (Java) 7° 42′ S., 114° 12′.6 E. 9 Metres. Coarse sand. 2 Spec.
Stat. 174. Waru-bay, North coast of Ceram. 18 Metres. Mud. 2 Spec.
Stat. 294. 10° 12′.2 S., 124° 27′.3 E. Timor Sea. 73 Metres. Soft mud with very fine sand. 1 spec.
Stat. 296. Anchorage off Noimini, South coast of Timor. 10° 14′ S., 124° 5′.5 E. Sandy mud. 4 Spec.

Diagnosis. Shell long and slender, moderately arcuate, attenuated posteriorly, the length about $12^1/_2$ times the diam.; rather thin; white, shining. Sculpture of numerous, unequal, irregularly spaced encircling ribs, rather low and rounded, with fine growth lines throughout; sometimes showing traces of longitudinal striation in places. Aperture subcircular or rounded-ovate, narrower toward the concave side; peristome thin. Anal orifice small, rounded-oval, the greatest diameter antero-posterior; a slight notch on the convex side or none.
Length 95, antero-posterior diam. apert. 4,7, lateral diam. 4,5, diam apex 0,9 mill.
Length 66, diameters of apert. 5,3 of apex 0,9 mill. (P. & Sh.).

Distribution. Singapore; Sullivan Island, Mergui Archipelago in 7 fms (Anderson); Siam; Philippines; Java.

Remarks. This species is easily recognised by the numerous circular swellings of the tube. Generally after each swelling there is a more deeply incised growthline.

I hold *D. Philippinarum* Sowb. to be only a name for young specimens of *eburneum*. Most of the Siboga specimens are young; they are reddish or golden brown, much attenuated, very narrow and sometimes striated near the apex. In older specimens the colour becomes lighter, the diameter increases proportionally and the elevated concentric rings become stronger.

Sowerby thus describes it:

D. Phillippinarum Sowerby.

Shell elongated, very narrow, rather straight, semipellucid, highly polished, somewhat golden brown banded with numerous elevated concentric rings; apex attenuated; apical fissure very short.

Isl. Samar, Philippines.

Generally of a darker golden brown colour, much narrower and straighter than *Dentalium eburneum*.

Several fine specimens of *D. eburneum* are at the Zool. Mus. of Amsterdam. One of these struck me as rather peculiar: in place of the low variceal rings, the tube shows only some irregularities of growth, while the apex is striated. The surface is very smooth and brilliant with numerous inconspicuous growthlines. The growthlines are at regular distances and rather deeply incised. Toward the anterior aperture the tube shows tendency of forming concentric rings. This fact convinced me that this shell, though distinguished by some minute details, belongs to *D. eburneum*.

D. novaehollandiae Chenu proved after comparison to be exactly like our peculiar specimen of *eburneum*, but here the tendency to form variceal rings is yet a little stronger, as may be seen on the photograph Pl. IV, fig. 13 made after a specimen of the Mus. d'hist. nat. of Paris. Here follows CHENU's description; transcribed from PILSBRY & SHARP p. 93:

D. novaehollandiae Chenu. Pl. IV, fig. 12 and 13.

Shell subarcuate whitish, smooth anteriorly, with very minute striae on the posterior third. A species of large size, white, glossy, remarkable for the fine striation of the upper (smaller) end, while the larger portion is smooth with faint growth striae only.
Length 76, diam. of aperture 4,2 mill. (from fig.) (CHENU).

Australia.

The smooth form of *eburneum* might be considered a variety and then be called var. *novaehollandiae*.

*64. *Dentalium lacteum* Deshayes. Pl. I, fig. 21. Pl. VI, fig. 35.

1825. *Dentalium lacteum* Deshayes, Mém. Soc. Hist. Nat. Paris, II, p. 362, pl. 16, fig. 27.
1866. *Dentalium lacteum* Deshayes. SOWERBY, Thes. Conch. III, p. 98, pl. 225, fig. 48.
1873. *Dentalium lacteum* Deshayes, Conch. Icon. pl. VI, fig. 37.
1897. *Dentalium lacteum* Deshayes. PILSBRY & SHARP, Manual of Conch., vol. XVII, p. 99, pl. 19, fig. 1.

Diagnosis. Shell cylindrical, somewhat curved, very smooth and polished, whitish, milky, subtranslucent.

Smaller than entalis, and proportionately less in diameter, invariably of a milky subtransparent color, thinner than entalis and not striated at the small end.
Length 30, diam. $2^1/_2$ mill. at the base. No slit. (P. & SH. from DESH.).

Distribution. India (DESH.); Seychelles (Mus. d'hist. nat. Paris).

Remarks. This species has not been obtained by the Siboga. At first I thought I could identify one specimen with *lacteum* but after more careful examination this proved to be *D. subtorquatum* Fischer, being transversely striated near the apex. There are in the collection of the Zoological Museum of Amsterdam several specimens labelled *D. lacteum* Desh. They had suffered from time and dust and after having been cleaned proved to hold several specimens with a striated apex. The same happened to be the case with specimens examined at the British Museum and with some obligingly sent to me by Mr JOUBIN from the Mus. d'Hist. Nat. of Paris. Of the nine Paris specimens three are longitudinally striated at the apex; of these, two have a small slit on the convex side, one of which has a slight wave on the opposite side, internally lined with a small rim, reminding one of forms in the group of *D. semistriatum*. DESHAYES in his Monograph especially mentions the fact that *D. lacteum* is not striated at the apex, so that these striated specimens cannot belong to that species. As I have seen no fresh striated specimens, I cannot judge with certainty to what species they then belong, but hold it for possible that some at least may prove to be *D. aciculum*.

The smooth specimens alone deserving the name of *lacteum* it remains a question whether this species is really well defined, a question however I have no means of answering.

*65. *Dentalium bisinuatum* André. Pl. II, fig. 29.

1896. *Dentalium bisinuatum* André, Revue Suisse de Zool. et Ann. du Mus. d'Hist. Nat. de Genève, IV, fasc. 2, p. 397, pl. 17, fig. 9.
1897. *Dentalium bisinuatum* André. PILSBRY & SHARP, Man. of Conch., vol. XVII, p. 108, pl. 19, figs 7, 8.

Diagnosis. Shell conic, perfectly circular in transverse section, little curved, thin, translucid, glossy of a yellowish corneous color; with oblique regular, fine transverse striae. Aperture circular, a little oblique; peristome sharp, irregular. Apex with two small notches, one ventral, the other dorsal, a little deeper than the former.
Length 33,5; diameter of the aperture 3 of apex 0,5 mill. (P. & SH. from ANDRÉ).

Distribution. Amboyna.

66. *Dentalium banale* n. sp. Pl. VI, fig. 30.

Stat. 300. 10°48'.6 S., 123°23'.1 E. Timor Sea. 918 Metres. Fine grey mud. 2 Spec.

Diagnosis. Shell evenly and moderately curved, circular in section, pretty strong. No sculpture except for many close irregular and rather conspicuous growth striae with here and there a deeper incised line. Colour white or bluish white. Apex simple, without slit or notch, circular, with thick walls, in which the concentric structure of the shell is clearly visible. In both specimens the shell's inner layer projects a little above the rest, faintly indicating the existence of a supplemental tube. Anterior aperture circular with thin strong edges, little oblique.
Length 39 mill., diam. of anterior aperture 2,9 mill., diam. of apex 1 mlll.
Length 43 mill., diam. of anterior aperture 3,2 mill., diam. of apex 1,3 mill.

Remarks. This species hardly has any distinctive characters. For its lack of sculpture I have placed it in the subgenus *Laevidentalium*, though it is possible that it is related to species of the subgenus *Plagioglypta*. The deeply incised circular lines remind one of the "segments" in *D. semitracheatum*. Both specimens obtained by the Siboga are much eroded, and show many white opaque patches, with here and there a dark brown deposit in more deeply eroded parts.

Subgenus **Plagioglypta** Pilsbry.

Plagioglypta Pilsbry in Textbook of Palaeontology and PILSBRY & SHARP, Man. of Conch., vol. XVII, p. XXXI.

Shell circular or elliptical in section, without longitudinal sculpture, with close and fine obliquely encircling wrinkles throughout or on the posterior portion. Type *D. undulatum* Münster (P. & SH.).

This group is especially characteristic of the early and middle Mesozoic, and it is therefore

greatly interesting that some recent species have been found, which fall into this group. They are nearly all from the deep-sea.

Key to species.

I. Transverse striae distributed over the whole surface. Length 60—75 mill. about 14—15 times the greatest diam. . . . . *tracheatum.*

II. Transverse striae only near the apex, shell anteriorly smooth.

a. Length 60—75 mill., about 11—12 times the greatest diam. . . . *semitracheatum.*

b. Length 22, diam. 2 mill. . . . . *subtorquatum.*

c. Length 20 mill., about 12—13 times the greatest diam . . . . . *anulosum.*

67. *Dentalium semitracheatum* n. sp. Pl. IV, figs 20, 21.

Stat. 45. 7° 24′ S., 118° 15′.2 E. Flores Sea. 794 Metres. Fine grey mud. 6 Spec.
Stat. 284. 8° 43′.1 S., 127° 16′.7 E. Timor Sea. 828 Metres. Grey mud. 1 Spec.
Stat. 300. 10° 48′.6 S., 123° 23′.1 E. Timor Sea. 918 Metres. Fine grey mud. 2 Spec.
Stat. 314. 7° 36′ S., 117° 30′.8 E. Flores Sea. 694 Metres. Fine sandy mud. 2 Spec.

Diagnosis. A beautiful big white shell, well-curved, tapering, sculptured near the apex with many extremely fine, close rings as in *D. tracheatum.* This ringed appearance remains visible over a distance of about one sixth to one seventh of the shell's length. The shell then becomes smooth, with many superficial growth striae, and with at regular distances some deeper incised lines. They give the shell a faintly "segmented" appearance, each "segment" measuring about 0,3 mill. Apex entire, simple, thin-edged. Anterior aperture circular, rather oblique.
Length 75 mill., diam. of ant. aperture 6,5 mill.
Length 71 mill., diam. of ant. aperture 6,5 mill.
Length 45 mill., diam. of ant. aperture 5 mill.
Length 58 mill., diam. of ant. aperture 6 mill.

Remarks. Superficially this shell resembles big specimens of *D. usitatum,* but is easily distinguished by the transversely ribbed apex.

68. *Dentalium tracheatum* n. sp. Pl. IV, fig. 22.

Stat. 45. 7° 24′ S., 118° 15′.2 E. Flores Sea. 794 Metres. Fine grey mud, with some radiolariae and diatomes. 3 Spec. and a fragment.
Stat. 208. 5° 39′ S., 122° 12′ E. Banda Sea. 1886 Metres. Solid green mud. 3 Spec. and some fragments.
Stat. 271. 5° 46′.7 S., 134° 0′ E. Arafura Sea. 1788 Metres. Bluish green mud of a uniform appearance. 10 Spec.
Stat. 300. 10° 48′.6 S., 123° 23′.1 E. Timor Sea. 918 Metres. Fine grey mud. 4 Fragments.
Stat. 314. 7° 36′ S., 117° 30′.8 E. Flores Sea. 694 Metres. Fine sandy mud. One fragment.

Diagnosis. Shell long, cylindric, very slightly curved, extremely fragile. Sculpture: the entire surface from apex to anterior aperture with close-set minute rings, reminding one the structure of an insect's trachea. Posteriorly the rings are very close and slightly raised; near the anterior aperture, especially in old specimens, the incised lines get a little further out each

other, while the rings become flatter. Apex entire, round with thin edges; anterior aperture circular, sometimes a little irregularly shaped, hardly oblique. Colour whitish or of a dead yellow, with the glimmer of a bobbin of silk. Some specimens have a dark brown deposit near the anterior aperture. Young specimens when kept in alcohol are absolutely hyaline.
Length 75 mill., diam. of anterior aperture 4,2 mill.
Length 45 mill., diam. of anterior aperture 3,1 mill.

69. *Dentalium subtorquatum* Fischer. Pl. VI, fig. 36.

1871. *Dentalium subtorquatum* Fischer, Journ. de Conch. XIX, [(3) XI], p. 218 and 212, pl. IX, fig. 1.
1897. *Dentalium subtorquatum* Fischer. PILSBRY & SHARP, Man. of Conch., vol. XVII, p. 101.

Stat. 260. 5° 36'.5 S., 132° 55'.2 E. Off Kei-islands. 90 Metres. Sand, coral and shells. 1 Spec.

Diagnosis. Shell white, thin, narrow, shining, cylindrical, slightly curved. Encircled at the apex with minute, close, somewhat raised transverse striae. Apex entire. No longitudinal striation. Length 22, diam. 2 mill. (P. & SH. from FISCHER).

Distribution. Suez (GAUDRY); Kais or Gais Island, 15 fms, also lat. 26° 50' N., long. 52° 50' E. (MELV. & ST.).

70. *Dentalium anulosum* Braz. Pl. VI, figs 38, 39.

1877. *Dentalium anulosum* Brazier, Proc. Linn. Soc. N. S. Wales, II, p. 58.
1897. *Dentalium anulosum* Brazier. PILSBRY & SHARP, Man. of Conch., vol. XVII, p. 101.

Stat. 314. 7° 36' S., 117° 30'.8 E. Flores Sea. 694 Metres. Fine, sandy mud. 3 Spec.

Diagnosis. Shell thin, transparent, tapering, slightly curved, marked by incised circular lines from the apex to the centre, and from that to the base quite smooth, apex thickened, perforated, perforation entire, aperture circular. Length 14 mill. (BRAZ.).

Distribution. Princess Charlotte Bay, North East Australia, 13 fms. Sandy bottom. (Chevert Exp.).

Remarks. BRAZIER adds: "The upper part of this beautiful, thin, transparent shell has a ringed appearance like a *trachea*. Allied to *Dentalium politum* Linn., that species being distinguished by the incised lines that divide its whole length".

Three specimens were obtained. The youngest individual is well-curved, much attenuated, and has a very slight notch. Both the adults are nearly straight, with a truncated thickened apex and a small accessory tube. They resemble forms of the subgenus *Episiphon*. *Anulosum* evidently is related to *D. tornatum* Watson, reported from the Fiji Isl., but it is larger and the grooves at the top are less deep.
a. Length 22, diam. at apert. 1,7 mill.
b. Length 19, diam. at apert. 1,5 mill.
c. Length 15, diam. at apert. 1,4 mill.

Subgenus **Fustiaria** Stoliczka 1868.

1868. *Fustiaria* Stoliczka, Mem. Geol. Surv. India, Cretaceous Fauna of Southern India II, p. 439. Type *D. politum* Linné.
1897. *Fustiaria* Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 127.

Shell regularly tapering, arcuate polished; either smooth or sculptured with regular encircling grooves, dividing the surface of the tube into short oblique segments. Aperture circular. Anal orifice round or ovate. Slit a very long, straight, linear cleft on the convex side.

But few living species of *Fustiaria* are known; but there are numerous Tertiary forms and perhaps some from the Cretaceous. (From Pilsbry).

Key to species.

I. Shell sculptured with many encircling grooves. . . . . *politum.*
II. Shell smooth.
a. Colour milk-white. . . . . *stenoschizum.*
b. Reddish at the apex, anteriorly fading to white. . . . . *tenuifissum.*

*71. *Dentalium politum* Linné. Pl. I, fig. 20.

1766. *Dentalium politum* Linné, Syst. Nat. (12), p. 1264.
1825. *Dentalium politum* Linné. Deshayes, Mém. Soc. Hist. Nat. Paris, II, p. 368, pl. 17, figs 8, 9.
1860. *Dentalium politum* Linné. Sowerby, Thes. Conch. III, p. 99, pl. 225, fig. 46.
1864. *Dentalium politum* Linné. Desh., An. s. Vert. Bassin Paris, II, p. 215, pl. 2, figs 11—13.
1872. *Dentalium politum* Linné, Conch. Icon., pl. 6, fig. 38.
1897. *Dentalium politum* Linné. Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 128, pl. 19, figs 18—21.
Dentalium eburneum Desh. non Linné. Sowb., Genera of shells fig. 6.

Diagnosis. Shell slender, long, slowly tapering and regularly arcuate, polished. Sculptured with many narrow encircling grooves, parallel with the peristome, and dividing the surface into narrow, oblique segments. Aperture somewhat oblique, circular, the peristome acute. Anal orifice rounded-ovate, somewhat channelled within at the position of the slit. Slit an extremely narrow and long cleft on the convex side.
Length 58, diam. aperture 4,9 mill.
Length 39, diam. aperture 3,3 mill.

Distribution. Paris Basin (Eocene); recent in Indian seas (Desh. and Sowb.); Indian Ocean (Melvill & Standen).

Remarks. No specimens were obtained by the Siboga. Mr Pilsbry writes: Whether the Eocene and living specimens referred to *D. politum* are identical is a question we have no means of answering, as we have seen no recent specimens. It is admitted to the modern fauna on the authority of Deshayes and Sowerby who state that they have examined oriental recent shells, although the former in his Paris Basin Invertebrates (p. 216) thinks that Linnaeus'

shell may have been a fossil one". It has now also been reported by MELVILL & STANDEN as generally distributed in the Indian Ocean at 7—60 fms.

72. *Dentalium stenoschizum* P. & SH. Pl. VI, figs 16, 17.

1897. *Dentalium stenoschizum* Pilsbry & Sharp, Man. of Conch. vol. XVII, p. 128, pl. 19, figs 10—15.
1860. *Dentalium translucidum* Desh. SOWERBY, Thes. Conch. III, p. 98, pl. 225, fig. 47.
1872. *Dentalium translucidum* Desh., Conch. Icon. XVIII, pl. 6, fig. 39.
Not *D. translucidum* Desh. 1825.

Stat. 37. Sailus ketjil, Paternoster-islands. 27 Metres and less. Coral and coralsand. 4 Spec.
Stat. 104. Sulu-harbour, Sulu-island. 14 Metres. Sand. 2 Spec.
Stat. 184. Anchorage off Kampong Kelang, South coast of Manipa-island. 36 Metres. Coral, sand. 2 Spec.
Stat. 258. Tual-anchorage, Kei-islands. 22 Metres. Lithothamnion, sand and coral. 1 Spec.

Diagnosis. Shell rather strongly arcuate toward the smaller end, rapidly tapering, the earlier portion slender and delicate, the length about 10 times the diameter of aperture. Milk-white, somewhat translucent. Very glossy and polished throughout, and entirely without sculpture except for slight, inconspicuous annular irregularities of growth. Aperture slightly oblique, nearly circular, being a trifle compressed laterally; peristome thin. Anal orifice circular, with thin edges. Slit extremely narrow, linear, and long, its length contained about $3^1/_2$ times in length of shell, situated on the convex side.
Length 35, antero-posterior diam. aperture 3,4, lat. diam. 3,2; diam. of apex 0,6 mill.
Length 34,5, antero-posterior diam. aperture 3,5, lat. diam. 3,4; diam. of apex 0,5 mill.

Distribution. West-Indies.

Remarks. This species was only known from the West-Indies, and is now proved to occur also in the East Indian Archipelago. I have compared the Siboga specimens with some of the Mus. d'hist. nat. de Paris. They were sent to me under the name of *D. translucidum* Desh. and proved to be no other than the *D. translucidum* Desh. of SOWERBY in the Thes. Conch. and Conch. Icon. and which has been renamed *D. stenoschizum* by Messrs PILSBRY & SHARP. The true *D. translucidum* is a form without a slit of unknown habitat.

73. *Dentalium tenuifissum* Monterosato. Pl. VI, figs 18, 19.

1897. *Dentalium tenuifissum* Monterosato. PILSBRY & SHARP, Man. of Conch., vol. XVII, p. 129, pl. 19, figs 16, 17.
1884. *Pseudantalis tenuifissa* Monterosato, Nom. Gen. e spec. Conch. Medit. p. 33.

Stat. 51. Madura-bay and other localities in the southern part of Molo-strait. From 69—91 Metres. Fine grey sand; coarse sand with shells and stones. 8 Spec.
Stat. 153. 0° 5'.8 N., 130° 24'.3 E. North off Waigeu-island. 141 Metres. Fine and coarse sand with dead shells. 1 Spec..
Stat. 204. 4° 20' S., 122° 58' E. Between islands Wowoni and Buton. From 75—94 Metres. Sand with dead shells. 1 Spec.
Stat. 240. Banda-anchorage. 9—45 Metres. Black sand. Coral. 14 Spec.
Stat. 248. Anchorage off Rumah Lusi, North-point of Tiur-island. Till 54 Metres. 1 Fragment.

Diagnosis. Shell slender, tapering, rather strongly arcuate in young specimens, straighter in adults; cylindrical, the length about 10 times the greatest diameter. Surface very glossy and smooth, growth lines hardly perceptible. Colour near the apex reddish, sometimes deeply flesh-coloured and fading to white or yellowish white near the anterior aperture. Anterior aperture circular, slightly oblique, peristome thin-edged. Apex with a deep narrow slit on the convex side, continuing in an internal groove, its length contained about 4—5 times in length of shell.
Length 36, diam. of apert. 3,4, length of slit 4,5 mill.
Length 32, diam. of apert. 3,1, length of slit 7,5 mill.
Length 30, diam. of apert. 2,5, length of slit 7,5 mill.

Distribution. Naples. Sicily (Monts).

Remarks. Resembling strongly *D. rubescens* Desh. [1]) and occurring in the same localities with that species, *tenuifissum* was at first treated as a variety of *rubescens*. I have hesitated before recepting Mr Pilsbry's view of treating them as distinct species. It is a fact that but for the long linear slit in *tenuifissum* both species bear a marked resemblance to each other. Moreover I find that there is in the specimens of *D. rubescens*, obligingly sent to me by Mr Joubin from the Mus. d'Hist. Nat. de Paris, a long internal groove, ending near the apex in a small triangular notch. This fact had already been mentioned by Deshayes in his Monograph. But also in *tenuifissum* the slit continues anteriorly in an internal groove, exactly like the one in *rubescens*. The only difference therefore which remains between both species is that in *tenuifissum* the groove is posteriorly (near the apex) open, while in *rubescens* it seems to be always shut. No specimens of the kind of *rubescens* were obtained by the Siboga and it is therefore that I have treated them as distinct species.

II Family. SIPHONODENTALIDAE.

Scaphopoda having the foot either expanded distally in a symmetrical disk with crenate continuous edge with or without a median finger-like projection, or simple and vermiform, without developed lateral processes. The shell is small and generally smooth, often contracted towards the mouth. Other characters essentially as in Dentaliidae. (P. & Sh.).

Key to genera of Siphonodentalidae.

I. Shell largest at aperture, thence tapering to apex.
a. Longitudinally ribbed, angular in section at least near the apex. *Entalina* . . . p. 61
a'. Smooth; circular or subcircular in section throughout . . . *Siphonodentalium*. p. 64
II. Shell more or less swollen near the middle or anteriorly, contracting toward the aperture as well as tapering posteriorly . . . . *Cadulus* . . . p. 65

1) *D. rubescens* Desh. Mém. Soc. Hist. Nat. Paris, II, p. 363, pl. 16, fig. 23—25 (1825) and Pilsbry & Sharp, Man. of Conch. vol. XVII, p. 105, pl. 19, fig. 2 (1897).

Genus **Entalina** Monterosato 1872.

1872. *Entalina* Monter. Notizie intorno alle Conchiglie Fossile di Monte Pellegrino et Ficarazzi p. 27.
1897. *Entalina* Monter., PILSBRY & SHARP, Man. of Conch., vol. XVII, p. 131.

Shell Dentalium-like, largest at the aperture, thence tapering to the apex; strongly ribbed, and angular in section near the apex. Foot expanding distally into a disk with digitate periphery, and having a median process or filament. Type *E. quinquangularis* Forbes.

Key to species.

I. Shell pentagonal at the apex, becoming anteriorly quadrate tubular.
  a. The four angles persisting toward aperture.
    b. Longitudinally striate over the whole surface . . . . . *quadrangularis.*
    b'. Longitudinal striae only near the four angles or sometimes only on the inner curve . . . . . *platamodes.*
  a'. The four angles becoming obsolete toward aperture . . . . . *mirifica.*
II. Shell trigonal or faintly trigonal near apex.
  Inner curve delicately rounded . . . . . *cornucopiae.*
  Inner curve with a longitudinal keel . . . . . *mediocarinata.*

1. *Entalina platamodes* Watson. Pl. II, fig. 38. Pl. VI, figs. 76—78.

1879. *Siphodentalium platamodes* Watson, Journ. Linn. Soc. London, XIV, p. 519.
1886. *Siphodentalium platamodes* Watson, Chall. Rep. Scaph., p. 13, pl. 2, fig. 4.
1889. *Dentalium platamodes* Watson. DALL, Ball. U. S. Mus., n° 37, p. 76.
1897. *Entalina platamodes* Watson. PILSBRY & SHARP, Man. of Conch., vol. XVII, p. 133, pl. 23, figs 3, 4, 5.

Stat. 88. 0° 34′.6 N., 119° 8′.5 E. Celebes Sea. 1301 Metres. Fine grey mud. 6 Spec.
Stat. 178. 2° 40′ S., 128° 37′.5 E. Ceram Sea. 835 Metres. Blue mud. 1 Spec.
Stat. 211. 5° 40′.7 S., 120° 45′.5 E. Banda Sea. 1158 Metres. Coarse grey mud, superficial layer more liquid and brown. 3 Spec.
Stat. 221. 6° 24′ S., 124° 39′ E. Banda Sea. 2798 Metres. Solid bluish grey mud with foraminiferae, covered by a 5 cM. thick layer of brown mud, uppermost layer of foraminiferae. 2 Spec.
Stat. ? 1 spec.

Diagnosis. Shell small, solid, finely tapered, curved, especially toward the apex, five-sided, with four sharp corners, which are nearly right angles, and one very obtuse angle along the concave curve; these all tend to disappear toward the apex, the young shell being rounded. Sculpture: the angles of the shell project more or less in a sharp rounded rib, which is sometimes double; there are a few longitudinal striae, regular, 0,01 inch apart, strongest near the angles, more or less obsolete as they recede from these. Neither end is fresh enough for description. Length 0,47 inch, breadth 0,049 inch. (WATSON).

Distribution. North of Culebra Island, West-Indies, 390 fms (Challenger); Florida Strait 33½ miles S. of Rebecca Shoal 430 fms.

Remarks. The difference of locality made me hesitate whether the Siboga specimens could be identified with *Entalina platamodes* Watson. After comparison with the type in the British Museum however, it is no longer doubtful that this species, hitherto only reported from the W.-Indies and the Gulf of Mexico, is also distributed in the East Indian Archipelago.

The Siboga specimens are very large; they are well-curved and longitudinal striae, generally 12 in number, regularly cover the whole of the concave side. Anterior aperture indistinctly pentagonal; generally a very faint angularity in the middle of the inner margin. Apex pentagonal; anal orifice generally simple, but two specimens have a short notch on the convex curve.

*2. *Entalina mirifica* Smith. Pl. II, fig. 37.

1895. *Dentalium mirificum* E. A. Smith, Ann. Mag. Nat. Hist. (6), XVI, p. 9, pl. 2, fig. 1.
1897. *Entalina mirifica* E. A. Smith. PILSBRY & SHARP, Man. of Conch., vol. XVII, p. 134, pl. 20, fig. 29.

Diagnosis. Shell small, strongly curved and acuminate toward the apex, quadrate tubular, wider along the inner curve than along the outer; longitudinally delicately striate, very delicately sculptured with growth-lines; subconcave between the angles. Length 19, greatest diam. $2^1/_2$ mill. (SMITH).

Distribution. Off Trincomalee Ceylon 200—350 fms.

This little species is remarkable for the sharply curved end and the subquadrate form. The four angles are acute at the tip, but gradually become obtuse as the shell increases. The incurved side is the broadest of all, and up the middle of it, especially towards the apex, there is a raised striation more conspicuous than the rest. This is so prominent at the end that, when viewed with the opening towards the eye, five angles are visible. The two angles on the excurved side, which is the narrowest of all, become almost obsolete near the aperture. The form of the aperture, owing to the greater width and flatness of the incurved side, is very like the letter D. (SMITH).

3. *Entalina quadrangularis* n. sp. Pl. VI, figs 73, 74, 75, 85, 86.

Stat. 88. 0° 34'.6 N., 119° 8'.5 E. Celebes Sea. 1301 Metres. Fine grey mud. 1 Spec.
Stat. 151. 0° 12'.6 S., 129° 48' E. Halmahera Sea. 845 Metres. Fine grey mud with coarse particles. 1 Spec.
Stat. 256. 5° 26'.6 S., 132° 32'.5 E. off Kei-islands. 397 Metres. Greyish green mud. 1 spec.

Diagnosis. Shell white, rather strongly curved, decidedly quadrangular with a flat excurved, two flat lateral and a flat incurved side. The incurved side is widest and has near the apex an obtuse longitudinal angle, the shell being there faintly pentagonal. This angle disappears before the shell's middle is reached. All the sides are finely longitudinally ribbed, the ribs rounded very narrow, separated by wider interstices. Anterior aperture distinctly quadrangular, the lateral sides slightly concave. Apex pentagonal, simple.

Fig. 28.
Ant. apert. of *Entalina quadrangularis.*

a. Length 19 mill.; breadth of aperture along the inner margin 2,7, along the outer margin 1,1 mill.
b. Length 16 mill.; breadth of aperture along the inner margin 2,8, along the outer margin 1,5 mill.
c. Length 12,5 mill.; breadth of aperture along the inner margin 2,4, along the outer margin 1,1 mill.

Remarks. This shell is nearly related to *Entalina platamodes* Watson and *Entalina mirifica* Smith. It is distinguished from the former by a greater rate of increase and a coarser and more generally distributed sculpture; of the latter by the distinctly quadrangular form of the anterior aperture.

It is also nearly related to *Dentalium tetragonum* Brocchi [1]) a fossil shell from the North Italian Tertiary and to *Dentalium quadratum* K. Martin [2]) of the Java Tertiary. To judge after the figures, they seem to represent intermediate forms between *platamodes*, *mirifica* and *quadrangularis*.

4. *Entalina mediocarinata* n. sp. Pl. VI, figs 70, 71, 72, 87 88.

Stat. 5. 7° 46′ S., 114° 30′.5 E. Bali Sea. 330 Metres. Mud. 2 Spec.
Stat. 256. 5° 26′.6 S., 132° 32′.5 E. Off Kei-islands. 387 Metres. Greyish green mud. 1 Spec.

Diagnosis. Shell moderately curved, compressed between inner and outer curve, near the apex trigonal in section; the excurved side flat, the incurved side laterally compressed forming a strong prominent keel, sharp near the apex, obtuse toward the anterior aperture. Sculpture of 40—50 weak rather equal riblets, separated by shallow interstices; near the apex the riblets are alternately small and large, or if not so only half the number is developed. On the excurved side runs a slightly concave band, sculptured with finer riblets than in the neighbouring parts, on the incurved side, 2 or 3 ribs running along the keel's edge are stronger than the rest. In the largest specimen the ribs are broader and less raised than in the smaller ones. Obliquely encircling growth striae, exceedingly fine and regular making numerous slight impressions on the riblets. Apex with a short angular notch on the excurved side. Anterior aperture very oblique and jagged from fracture, compressed in antero-posterior direction. Colour milky white, a little transparent in live specimen.

Fig. 29. Ant. apert. of *Entalina mediocarinata*.

a. Length 25 mill., antero-posterior diam. of apert. 3 mill., lateral diam. of apert. 3,3 mill.
b. Length 19,5 mill., antero-posterior diam. of apert. 2,3 mill., lateral diam. of apert. 2,5 mill.
c. Length 13 mill., antero-posterior diam. of apert. 2,3 mill., lateral diam. of apert. 2,3 mill.

5. *Entalina cornucopiae* n. sp. Pl. VI, fig. 89.

Stat. 52. 9° 3′.4 S., 119° 56.7 E. Sumba Sea. 959 Metres. Globigerina ooze. 1 Spec.

Diagnosis. Shell white, moderately curved, the excurved side flat, a little concave near the top, the incurved side slightly laterally compressed, faintly suggesting the existence of a very obtuse longitudinal keel anteriorly delicately rounded. Sculpture of about 30 well-raised riblets, separated by equally wide or wider interstices. Growth striae very oblique, not conspicuous. Apex with a shallow notch on both the incurved and the excurved side. Anterior aperture very oblique, the margin on the excurved side flat.
Length 15,5 mill., diam. of apert. 3,2 mill.

Fig. 30. Ant. apert. of *Entalina cornucopiae*.

1) *Dentalium tetragonum* Brocchi, Conch. foss. subapp. II, p. 627, Tav. XII, fig. 26 (1814).
2) *Dentalium quadratum* K. Martin Samml. des Geol. Reichsmus. in Leiden, 1te Serie, Bd. III, (Tiefb. auf Java) p. 190, Tab. X, fig. 191 (1881—1887).

Remarks. Compared to *mediocarinata*, *cornucopiae* increases more rapidly in diameter and the incurved side is not so angular as in that species.

Genus **Siphonodentalium** M. Sars 1859.

1859. *Siphonodentalium* M. Sars, Forh. Videnskabs Selskabet in Christiania p. 52.
1861. *Siphonodentalium* M. Sars, Om Siphonodentalium vitreum en ny Slaegt og Art of Dentalidernes Familie.
? *Siphonodentalium* M. Sars. G. O. Sars, Moll. Reg. Arct. Norv., p. 103.
1897. *Siphonodentalium* M. Sars. Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 135. *Siphodentalium* Monterosato, Jeffreys and Watson.

Shell an arcuate, slightly tapering tube, largest at the aperture, circular or nearly so in section, and smooth externally. Apex rather large, typically slit into lobes, but sometimes simple. Foot capable of expanding into a terminal disk. Type *S. vitreum* Sars.

6. *Siphonodentalium australasiae* n. sp. Pl. VI, fig. 68.

Stat. 211. 5°40'.7 S., 120°45'.5 E. Banda Sea. 1158 Metres. Coarse grey mud, superficial layer more liquid and brown. 1 Spec.

Diagnosis. Shell at the top, between inner and outer curve very slightly compressed, cylindric at aperture, smooth and glossy, very fragile and transparent with many obliquely encircling opaque bands, crossed near the aperture by extremely faint longitudinal opaque bands; moderately arcuate. Apex simple, large. Anterior aperture wide, subcircular, the margin on the inner curve less rounded than on the outer curve.
Length 18 mill., diam. of apert. 2,5 mill., diam. of apex 1,3 mill.

Remarks. In outward appearance rather like the well-known *Siphonodentalium vitreum* Sars (Pilsbry, p. 136, pl. 23, figs 8—21), but the diameter increases less rapidly and it is not so strongly curved. The apex of *S. vitreum* is cut into six lobes or teeth, and that of *australasiae* shows some irregularities which perhaps indicate a similar kind of apex, but it is too imperfect for stating this with certainty. The radula of *australasiae* offers no differences to that of *vitreum*, described by Sars.

*7. *Siphonodentalium eboracense* Watson. Pl. III, fig. 44.

1872. *Siphodentalium eboracense* Watson, Journal Linn. Soc. Lond. XIV, p. 523.
1885. *Siphodentalium eboracense* Watson, Challenger Report, p. 17, pl. 2, fig. 10.
1897. *Siphonodentalium eboracense* Watson. Pilsbry & Sharp, Man. of Conch. vol. XVII, p. 140, pl. 26, fig. 75.

Diagnosis. Shell small, narrow, tapering very gradually throughout, toward the apex bent, thin, brilliant, translucent, and transparent in alternate bands. Sculpture: there are a few remote, irregular oblique, transverse striae; in the young shell the whole surface is covered with longitudinal striae; excessively minute (0,0005 in. apart), sharp and regular, but which seem very easily rubbed off (on two specimens they are barely traceable), and which disappear towards the mouth. The mouth is round, very oblique, sharp and thin. The apex is minute, and is broken straight across, and somewhat chipped. Length 0,185 inch., breadth 0,024; at apex 0,008 inch. (Watson).

Distribution. Torres Strait, Cape York, N. E. Australia, 3—11 fms. (Challenger).

Remarks. Than *Siphodentalium prionotum* Wats., this is smaller, straighter, but toward the apex more bent, not narrowed at the mouth; smaller at the apex, and the whole texture of the shell is different. Than *Siphodentalium vitreum* Sars, this is less cylindrical, is not contracted toward the mouth, and is much smaller toward the apex. (Watson).

Genus **Cadulus** Philippi 1844.

1844. *Cadulus* Philippi, Enum. Moll. Sicil II, p. 208.
1897. *Cadulus* Philippi. Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 142.

Shell more or less swollen near the middle or anteriorly, contracting toward the aperture as well as tapering posteriorly. Type *Dentalium ovulum* Phil.

Key to sections of *Cadulus*.

a. Apex with slits or notches.
  b. Apex with two lateral slits . . . . . Section *Dischides*.
  b'. Apex with four or more slits. . . . . Section *Polyschides*.
a'. Apex entire, unslit.
  b. Obese; both ventral and dorsal outlines convex and projecting beyond a chord connecting the adjacent lip edges; . . . . Section *Cadulus s.s.* (of this section no species are as yet reported from the Indo-pacific province).
  b'. More slender or attenuated; ventral outline convex; dorsal outline as a whole concave, not projecting beyond a chord connecting the ends of shell . . . . . Section *Gadila*.

Section **Dischides** Jeffreys 1867.

1867. *Dischides* Jeffreys, Ann. Mag. of Nat. Hist. (3), XX, p. 251.

Shell rather slender, not much bulging; apex cut into an anterior and a posterior lobe by two deep lateral slits, one on each side. Type *C. (Dischides) politus* S. V. Wood.

8. *Cadulus dichelus* (Watson). Pl. III, fig. 48. Pl. VI, fig. 51.

1879. *Siphodentalium dichelum* Watson, Journ. L. S. Lond. XIV, p. 521.
Siphodentalium dichelum Watson, Challenger Report p. 15, pl. 2, fig. 7.
1897. *Cadulus* (*Dischides*-group) *dichelus* (Watson). Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 145, pl. 26, fig. 73.

Stat. 59. 10° 22'.7 S., 123° 16'.5 E. Western entrance Samau-strait. 390 Metres. Coarse coral-sand with small stones. 1 Spec.

Diagnosis. Shell long, slightly swollen at about three-fifth of its length; the swelling bulges on the concave curve, but the convex curve is uninterrupted; between these two curves

it is compressed by one-sixth of its breadth, a little contracted in front, bent and attenuated toward the apex; thin, brilliant, white, almost hyaline, with a few minute, transverse, curdy streaks, but weathering to opaque. There is an opaque band round the apex. Sculpture: most faint and delicate microscopic scratches on the lines of growth, with a minute transverse flocculence and some vague indication of longitudinal texture in the substance of shell. The mouth is large, very oblique with a smoothly rounded edge, which is sharp on the inner margin; both it and the posterior opening are oval. The apex, which is small, is split on either side by a deep narrow slightly widening, smooth, clean-cut, but not perfectly regular cleft, which is evidently carried down the shell as the growth of the animal demands, for it cuts across the transverse striae, as Mr SEARLES WOOD remarks is the case with *Siphodentalium (Dischides) bifissum*. Within the opening a short, minute, longitudinal, rib-like process projects along the middle of the posterior (i. e. convex curve) wall; a little farther in a thin, narrow, circular callus runs round the opening.

Length 0,35 in. breadth at mouth 0,032; broadest 0,055; apex 0,022. (WATSON).

Distribution. Levuka Fiji 12 fms. (Challenger).

Remarks. I have compared the Siboga specimen with the type in the British Museum and find no other difference but the length which in the former measures 11,5 mill., exceeding by 2,75 mill. the length of the Challenger type. The greatest inflation is at a distance of about 5 mill. from the anterior aperture and measures in breadth 2,5 mill.

9. *Cadulus ovalis* n. sp. Pl. VI, fig. 52.

Stat. 51. Madura-bay and other localities in the southern part of Molo-strait. From 69—91 Metres. Fine grey sand; coarse sand with shells and stones. 2 Spec.

Diagnosis. A small graceful shell, moderately curved, very slightly swollen at a distance of about one fourth the length of the shell, measured from the anterior aperture; the convex curve uninterrupted, the concave curve with a hardly noticeable bulging. A frontal view of the concave curve shows a very gradual contraction from the greatest swelling toward the mouth. Mouth proportionately large, with a greater dorso-ventral diameter. Margin on the convex side nearly straight, on the concave side rounded, very faintly laterally compressed. Peristome hardly oblique. Apex with two lateral slits and slightly dorso-ventrally compressed.

Fig. 31. Anterior aperture and apex of *Cadulus ovalis*.

Length 9 mill., dorso-ventral diam. of aperture 0,8 mill.

Remarks. This shell is very like *C. Belcheri* and *C. prionotus*. The swelling seems to be a little stronger than in either of these species, and the shape of the mouth is different.

*10. *Cadulus prionotus* Watson. Pl. III, fig. 47.

1879. *Siphodentalium prionotum* Watson, Journ. Linn. Soc. Lond. XIV, p. 522.
1885. *Siphodentalium prionotum* Watson, Chall. Rep., p. 16, pl. 2, fig. 9.
1897. *Cadulus prionotus* Watson. PILSBRY & SHARP, Man. of Conch. vol. XVII, p. 146, pl. 26, fig. 74.

Diagnosis. Shell long, narrow, tapering, gently contracted at the mouth, slightly bent throughout; rather strong, polished, but hardly brilliant, translucent white. Sculpture: very faintly transversely striated on the surface, and a very minute flocculence in the same direction in the texture. For the breadth of the shell the mouth is large, perfectly round, oblique, with a smoothly rounded edge, which is sharp on its inner margin. The apex is small, much chipped, but that in such a way as in all the specimens to produce a shallow rounded hollow on either side, with a sharp, projecting point before and behind. Within the opening a short excessively minute riblet runs out along the middle of the posterior wall; it shines through the shell like a depression, being a little more transparent than the shell-wall.
Length 0,328 in., breadth at mouth 0,028; greatest 0,39; at apex 0,013 inch. (Watson).

Distribution. Raine Island, Cape York, N. E. Australia, 155 fms. (Challenger).

Remarks. This species differs from the previous (*dichelus*) in being much narrower and having no swelling.

*11. *Cadulus minutus* H. Adams. Pl. III, fig. 49.

1872. *Cadulus minutus* H. Adams, Proc. Zool. Soc. 1872, p. 10, pl. 3, fig. 9.
1872. *Dentalium minutum* Sowerby, Conch. Icon. XVIII, pl. 7, fig. 48.
1885. *Dentalium minutum* Sowerby, A. H. Cooke. Ann. Mag. N. H. (5), XVI, p. 273.
1897. *Cadulus minutus* H. Adams. Pilsbry & Sharp, Man. of Conch. vol. XVII, p. 188, pl. 26, fig. 78.

Diagnosis. Shell smooth, thin arcuate, a little contracted anteriorly, whitish. Aperture circular, slightly oblique. Length 4, diam. $^3/_4$ mill. (H. Ad.).

Distribution. Red sea.

Remarks. Judging after the figure which Sowerby has given, this shell very probably belongs to the section *Dischides*.

Section **Polyschides** Pilsbry & Sharp 1897.

1897. *Polyschides* Pilsbry & Sharp, Manual of Conch., vol. XVII, p. 146.

Shell inflated above the middle or not much bulging; apex cut into a number of lobes, generally four, by as many slits. Type *C. (Polyschides) tetraschistus* Wats.

12. *Cadulus hexaschistus* n. sp. Pl. VI, fig. 53.

Stat. 178. 2°40′ S., 128° 37′.5 E. Ceram Sea. 835 Metres. Blue mud. 1 Spec.

Diagnosis. A large white shell, moderately curved, not very strongly swollen, the gibbosity regularly narrowing toward both ends, except on the convex side near the anterior aperture, where the shell is slightly flattened and narrows more rapidly toward the mouth. Gibbosity hardly visible on the concave curve, stronger on the convex curve, but always rounded,

not angular. Anterior aperture slightly oblique, oval, the margin on the outer curve flattened. Apex slightly dorso-ventrally compressed, with three pair of slits, forming six teeth: one on the outer curve, one on the inner curve and two pair of lateral slits. The tooth on the inner curve is largest and very short; of the two lateral teeth the one next to the inner curve is the biggest, while the one next to the median tooth on the outer curve is very small but comparatively sharp.

Fig. 32.
Ant. apert. and inner curve of *Cadulus hexaschistus.*

Fig. 32*a*.
Apical orifice seen from the top of *Cadulus hexaschistus.*

Length 22 mill., dorso-ventral diam. of apert. 1,9 mill., lateral diam. of apert. 2,5 mill., lateral diam. of apex 0,8 mill.
Greatest diameter of shell 3,8 mill.

Remarks. This shell greatly resembles *C. spectabilis* Verrill, a deep sea species of the Western Atlantic, but to my regret I have not been in the opportunity of comparing the two. They differ however in the apical characters.

13. *Cadulus magnus* n. sp. Pl. VI, fig. 54.

Stat. 45. 7° 24′ S., 118° 15′.2 E. Flores Sea. 794 Metres. Fine grey mud. 1 Spec.
Stat. 88. 0° 34′.6 N., 119° 8′.5 E. Celebes Sea. 1301 Metres. Fine grey mud. 2 Spec.
Stat. 300. 10° 48′.6 S., 123° 23′.1 E. Timor Sea. 918 Metres. Fine grey mud. 1 Spec.

Diagnosis. A large white shell very like the previous, well and evenly curved, smooth and glossy, with inconspicuous growth striae. "Equator" very near the anterior aperture at a distance of about 1,5—2 mill. Gibbosity visible on both convex and concave curve, but better visible on the convex curve, where it is slightly angular. There is no sudden flattening on the convex side as in *hexaschistus*, but the shell narrows evenly toward the mouth. Anterior aperture rather oblique (more oblique than the equator), subcircular, the margin on the outer curve a little more arched than on the inner. Apex circular, probably with 4 or more incisions, but only one specimen has a small lateral tooth left, the rest being imperfect.

Fig. 33. Ant. apert. and inner curve of *Cadulus magnus.*

Length 25 mill.; diam. of apert. 3 mill., greatest diam. 3,3 mill., diam. of apex 1,2 mill.

14. *Cadulus longilobatus* n. sp. Pl. VI, figs 55, 56.

Stat. 133. Anchorage off Lirung, Salibabu Island up to 36 Metres. Mud and hard sand. 3 Spec.

Diagnosis. Shell near the apex slightly dorso-ventrally compressed, yellowish, transparent, with many opaque bands; hardly inflated, the bulging only faintly distinguishable on the concave curve; convex side regularly and moderately curved, very gradually tapering toward the anterior aperture. Greatest diameter at about 4 mill. distance from the mouth. Peristome thin and very oblique nearly circular the dorso-ventral diameter being a little longer than the lateral diameter. Apical orifice dorso-ventrally compressed, apex split by four rather

Fig. 34.
Anterior aperture and apex of *Cadulus longilobatus.*

deep slits, forming four teeth, a large dorsal and a large ventral tooth, with smaller lateral ones between.

Length 12 mill., diam. of apert. 1,25, dorso-ventral diam. of apex 0,5, lateral diam. of apex 0,7. Breadth of greatest inflation 1,5 mill.

Section **Gadila** Gray 1847.

1847. *Gadila* Gray, Proc. Zool. Soc. p. 159. For *D. gadus* Montagu.
1865. *Helonyx* Stimpson, Amer. Journ. Conch. I, p. 63.
Gadus of some authors. *Dentalium* sp. of some early authors.

Shell decidedly curved, the general contour convex ventrally, concave dorsally; more or less swollen near the middle or toward the aperture, more tapering toward the apex; apical orifice not contracted by a callous ring, or with the callus far within and weak; edges not slit. Type *C. gadus* Montagu.

This group which includes a great majority of the species of the genus is more attenuated and more bent than typical *Cadulus*, and lacks the apical slits and teeth of *Dischides* and *Polyschides*. (P. & Sh.).

Key to species.

I. Length not exceeding 4 mill. . . . . *C. simillimus.*

II. Longer than 4 mill.

a. The greatest diam. situated near the anterior third or fourth of the shell's length.

b. Shell considerably swollen.
C. gadus, *euloides*, *clavatus*. *colubridens*, *virginalis* and *pseudolivi*.

b'. Shell but little swollen and very gradually tapering toward both sides.
C. anguidens, *zonatus* and *pulcherrimus*.

a'. The greatest diam. situated near the anterior aperture.
C. singaporensis, *abrupto-inflatus* and *laevis*.

*15. *Cadulus simillimus* Watson. Pl. III, fig. 46.

1879. *Cadulus simillimus* Watson, Journ. Linn. Soc., vol. XIV, p. 526.
1885. *Cadulus simillimus* Watson, Challenger Rep. p. 20, pl. 3, fig. 6.
1897. *Cadulus simillimus* Watson. Pilsbry & Sharp, Man. of Conch. vol. XVII, p. 182, pl. 26, fig. 77.

Diagnosis. Shell very like *Cadulus gracilis* Jeffr., rather broad, narrowed at both ends, very slightly and symmetrically bent, but a little more towards the mouth, with a very slight bulge, which just shows on the concave curve. It is thin, polished, translucent (weathering opaque), with an opaque ring near the apex. Sculpture: very minute and faint and superficial oblique striae, with a faint flocculence in the substance of the shell. Mouth rather large, oblique;

edge thin, but rounded; apical opening small, thin, and chipped. Length 0,16 inch., breadth at mouth 0,02, greatest 0,036, at apex 0,014 inch. (WATSON).

Distribution. Raine Island, Cape York, N. E. Australia 155 fms. (Challenger).

*16. *Cadulus gadus* Montagu. Pl. III, fig. 40.

1803. *Dentalium gadus* Mont., Testacea Britanica p. 476, pl. 14, fig. 7.
1877. *Cadulus gadus* Mont. JEFFREYS, Ann. Mag. Nat. Hist. (4), XIX, p. 157.
? 1885. *Cadulus gadus* Mont. COOKE, Ann. Mag. Nat. Hist. (5), XVI, p. 275.
? *Cadulus gadus* Mont. MELVILL & ABERCROMBIE, Mem. & Proc. Manch. Lit. and Phil. Soc. (4), VII, p. 25.
1897. *Cadulus gadus* Mont. PILSBRY & SHARP, Manual of Conch., vol. XVII, p. 186, pl. 31, figs 28—32.

Diagnosis. Shell small, rather thin, but little curved and that mainly posteriorly; anterior half considerably and very regularly swollen, the greatest diameter slightly behind the anterior third of the length; tapering toward the aperture, on all sides a little more rapidly tapering posteriorly, decidedly attenuated toward the small apex. Outline of concave side decidedly modified and quite convex in the region of the inflation. Greatest diameter contained $4^1/_3$ to $4^1/_4$ times in the length of the shell. Surface smooth, with a glimmer somewhat like that of *C. incisus*; no perceptible growth striae; color whitish, imperfectly translucent. Tube slightly compressed from front to back, throughout. Aperture quite oblique when unbroken, and rounded-oval. Anal orifice very small, of the same shape, its edge apparently free from slits when uninjured.

Length 7,6 mill.; diam. at aperture 0,95 × 1,26; at largest 1,68 × 1,79 at apex 0,47 × 0,48 mill.; the antero-posterior diameter given first in each case.

Length 6,53 mill.; diam. at aperture 0,82 × 0,9; at largest 1,37 × 1,58, at apex 0,33 × 0,42 mill.

Distribution. Uncertain.

Remarks. I quote from PILSBRY: The species is quite distinct in its flask-like form, being conspicuously and evenly swollen but not in the least angulated anteriorly, and a good deal attenuated posteriorly. This peculiar and characteristic shape is for some reason more conspicuous in the shells themselves or in a natural size figure, than it is in the much enlarged camera drawings, although the latter are faithful in proportions.

No specimens were obtained by the Siboga, and the habitat of this species is still uncertain, but as Mr A. H. COOKE reports it from the Gulf of Suez (MAC-ANDREW coll.) and MELVILL and ABERCROMBIE include it in their Bombay list it seems from a practical point of view better to add it for the present to the list of the Indo pacific Siphonodentalidae.

*17. *Cadulus euloides* Melvill & Standen. Pl. III, fig. 52.

1901. *Cadulus euloides* Melvill & Standen, Proc. Zool. Soc. II, p. 459, pl. XXIV, fig. 24.

Diagnosis. Shell white, small, curved, smooth, posteriorly attenuated, anteriorly above

the middle slightly swollen. Aperture circular, posterior aperture small, circular, the margin thin and sharp.
Length 10, diam. of mouth 1,25 mill., diam. of apex of a larges specimen 0,5 mill.

Distribution. Gulf of Oman. lat. 24° 49′ N., 58° 56′ E. 345 fms. mud. Karachi (one example).

Remarks. Larger than *C. gadus* Mont., which we have not seen north of Bombay. It is a very smooth white shell, in some examples ringed obscurely with cinereous grey, in others pure white, incurved, shining posteriorly attenuated, from the centre to the mouth tumid, aperture round, margin acute. It was dredged very abundantly in the locality above given.

*18. *Cadulus clavatus* Gould. Pl. III, fig. 42.

1859. *Dentalium clavatum* Gould, Proc. Bost. Soc. Nat. Hist. VII, p. 166.
1865. *Helonyx clavatus* Stimpson, Amer. Journ. Conch. I, p. 63, pl. 9, fig. 14.
1897. *Cadulus clavatus* (Gould). Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 185, pl. 26, figs 80, 81, 79.

Diagnosis. Shell rather slender, moderately solid, considerably curved; maximum diameter situated near the larger end, gradually tapering posteriorly, anteriorly rather rapidly contracting at the sides and especially on the convex face, and very slightly on the concave face. Tube slightly flattened between the convex and concave sides throughout, least so at the apex. Bluish-white, becoming opaque white near the ends from the greater thickness of the shell there. Surface smooth, glossy, showing no striation; aperture slightly oblique, rounded-oval, a little more flattened on the convex than on the concave side. Apex small, rounded-oval, with perfectly simple, sharp edge. Length 11, diameter at aperture 1,2 × 1,4, at greatest girth 1,76 × 1,85, at apex 0,55 × 0,6 mill. (P. & Sh.).

Distribution. Hongkong Harbor, China 6—20 fms (Stimpson); Gulf of Suez(?) (Mac-Andrew).

Mr A. H. Cooke (Ann. and Mag. Nat. hist. (5) XVI, p. 275 (1885) reports *Cadulus clavatus* from the Gulf of Suez, but it is questionable wheter that really refers to the same specific form.

19. *Cadulus colubridens* Watson. Pl. III, fig. 41. Pl. VI, fig. 66.

1879. *Cadulus colubridens* Watson, Journ. Linn. Soc. Lond. XIV, p. 523.
1886. *Cadulus colubridens* Watson, Challenger Rep. Scaph. p. 18, pl. III, fig. 1.
1897. *Cadulus colubridens* Watson, Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 184, pl. 26, fig. 71.

Stat. 208. 5° 39′ S., 122° 12′ E. Banda Sea. 1886 Metres. Solid green mud. 2 Spec.
Stat. 211. 5° 40′.7 S., 120° 45′.5 E. Banda Sea. 1158 Metres. Coarse grey mud, superficial layer more liquid and brown. 2 Spec.

Diagnosis. Shell like an adder's fang, long, sharp, bent, very slightly flattened, swollen near the broader end. The swell, which is faintly angulated and is at one-fourth of the length,

is chiefly on the convex curve, but is visible on the concave curve too. From the angulation the curve is very equable in either direction till about two-thirds along towards the apex, where it bends a little more. The shell is thin, brilliant, semi opaque, white. Sculpture: Very faint and fine scratches on the lines of growth. Mouth large, oval, very slightly flattened on the ventral side, from which the thin, sharp edge is obliquely cut off upwards towards the convex curve. The posterior opening is much smaller, nearly round, and the edge is thin and chipped. Length 0,58 inch., breadth at mouth 0,067, greatest 0,1, at apex 0,033 inch. (WATSON).

Distribution Lat. 37° 34′ S., 179° 22′ E., N. E. point of New-Zealand, in 700 fms. (Challenger).

Remarks. This is twice the size of *C. gadus* Montagu, but it resembles that in the angulation, which however, is here more marked at the summit of the swelling; its expansion from the smaller end is more gradual, and its contraction from the angulation to the mouth is more rapid. (WATSON).

The measurement of three Siboga specimens is given here:

a. Length 20 mill., antero-posterior diam. of apert. 2 mill., lateral diam. of apert. 2,5 mill., greatest diam. of tube 3.3 mill., diam. of apex 0,8 mill.

Distance from mouth to "equator", measured on a lateral side, 6 mill.

b. Length 17 mill., antero-posterior diam. of apert. 2 mill., lateral diam. of apert. 2,3 mill., greatest diam. of tube 3 mill., diam. of apex 0,8 mill.

Distance from mouth to equator, measured on a lateral side, 5,5 mill.

c. Length 16 mill., antero-posterior diam. of apert. 2 mill., lateral diam. of apert. 2,3 mill., greatest diam. of tube 3,5 mill., diam. of apex 0,9 mill.

Distance from mouth to equator, measured on a lateral side, 4,5 mill.

Though the size is much greater than in WATSON's specimens the resemblance with the latter, (after comparison with the types in the British Museum) is so great, that it seems impossible to separate them.

20. *Cadulus virginalis* n. sp. Pl. VI, figs 60—64.

Stat. 52. 9° 3′.4 S., 119° 56′.7 E. Savu Sea. 959 Metres. Globigerina ooze. 5 Spec.
Stat. 208. 5° 39′ S., 122° 12′ E. Banda Sea. 1886 Metres. Solid green mud. 3 Spec.
Stat. 271. 5° 46′.7 S., 134° 0′ E. Arafura Sea. 1788 Metres. Bluish green mud of a uniform appearance. 1 Spec.
Stat. 284. 8° 43′.1 S., 127° 16′.7 E. Timor Sea. 828 Metres. Grey mud. 2 Spec.

Diagnosis. Shell rather strongly curved, translucent and glossy, with numerous faint and superficial longitudinal furrows, which are only visible by turning the shell slowly round under a strong lens. Growth striae hardly discernable, but many close transverse opaque bands give together with the longitudinal opaque striae a reticulated appearance to the shell's surface. Strongly swollen, greatest diameter at a distance of about 3 mill. from the anterior aperture, measured on the inward curve. Anterior to the equator the tube is flattened on the

Fig. 35.
Ant. apert. and apical orifice of *Cadulus virginalis.*

convex side. In some specimens there is a ∧-shaped depression near the dorsal edge of the peristome. Equator rather straight on the shell's longitudinal axe; anterior aperture oblique subcircular, the peristome inflexed along the dorsal margin. In some specimens the apex is simple, in others there is a shallow notch on both the ventral and the dorsal side. None of the specimens however are perfect so that this form of apex, which would be very peculiar for the genus *Cadulus*, is perhaps only due to accidental erosion.
Length 14 mill., diam. of apert. 2 mill., diam. at equator 3,1 mill.

Remarks. Compared to the specimens of Stat. 208, 271 and 284, those of Stat. 52 are a little more slender and slightly more bent. I hold them to be younger than the rest; the longitudinal furrows are here clearest visible; older specimens hardly show any longitudinal reflection at all.

21. *Cadulus pseudolivi* n. sp. Pl. VI, fig. 67.

Stat. 211. 5°40'.7 S., 120°45'.5 E. Banda Sea. 1158 Metres. Coarse grey mud, superficial layer more liquid and brown. 1 Spec.

Diagnosis. Shell white, shining, moderately curved, greatest swelling at about 3 mill., from the anterior aperture, measured on the outward, and at about 4 mill. measured on the inward curve. Gibbosity slightly angular on all sides. Tube at apex distinctly compressed between front and back curves. Apical orifice flattened simple with thick walls. Anterior aperture rounded oval, greatest diam. in antero-posterior direction, rather oblique thin-edged.
Length 13 mill., antero-posterior diam. of apert. 1,6 mill., lateral diam. 1,5 mill.; greatest diam. 3 mill.
Antero-posterior diam. of apex 1 mill; lateral diam. 0,7 mill.

Fig. 36.
Ant. apert. and apical orifice of *Cadulus pseudolivi*.

Remarks. *Pseudolivi* greatly rsembles *C. olivi* Scacchi from the Sicilian Pliocene, a form which has been reported as recent by Jeffreys (P. Z. S. 1882, p. 663; Ann. Mag. Nat. hist. (4) XIX, p. 157 and (5) VI, p. 317) with the following distribution: Florö, Norway; Bay of Biscay; Palermo; West of Ireland 1230 fms; South of the English Channel 862 fms.

Pilsbry (Man. of Conch. vol. XVII, p. 238) expresses his doubt whether the living forms can be identified with the pliocene species. Having not been able to compare the Siboga specimen either with Scacchi's types or with Jeffreys' examples I follow the safer coarse of describing it separately.

Here follows Pilsbry's description of a Jeffreysian example from the Sicilian Pliocene:

Cadulus olivi Scacchi.

Shell rather thin, moderately curved, the bend mainly posterior; moderately swollen, the "equator" indistinctly angular, at the anterior third of the length, slightly oblique; thence tapering moderately to the mouth, and more rapidly posteriorly, becoming attenuated toward the apex. Outline of concave side slightly modified, becoming a trifle convex in the region of

greatest inflation. Greatest diameter contained 5 times in length of the shell. Tube very slightly compressed between front and back curves. Surface polished, without perceptible growth striation. Aperture oblique, rounded oval; anal orifice subcircular, its edge even, unslit.
Length 11,7 mill., diam. at aperture 1,24 × 1,37, at greatest inflation 2,06 × 2,33, at apex 0,48 × 0,55 mill. (the antero-posterior dimensions given first in each case).

Pliocene of southern Italy & Sicily.

*22. *Cadulus anguidens* Melvill & Standen. Pl. III, fig. 50.

1898. *Cadulus anguidens* Melvill & Standen, Journ. of Conch. IX, p. 32, pl. 1, fig. 6.
1897—98. *Cadulus anguidens* Melvill & Standen. PILSBRY & SHARP, Manual of Conch., vol. XVII, p. 253, pl. 39, fig. 4.

Diagnosis. Shell a little arcuate, tapering toward the apex, pellucid white. Aperture rounded-ovate, the margin oblique; posterior orifice small, round, simple and thin. Length 8, diam. at mouth 1, at apex 0,5 mill. (M. & S.).

Distribution. Madras. (HENDERSON).

Remarks. A graceful, attenuate, slightly arcuate *Cadulus*, gradually increasing in diameter till the oblique aperture is reached. The shell is subpellucid, white, quite smooth; posterior or apical orifice minute, simple, round, thin, the mouth being roundly-ovate, with very oblique margin. Two specimens, differing from any in the national collection. (M. & S.).

23. *Cadulus zonatus* n. sp. Pl. VI, fig. 57.

Stat. 214. 6° 30′ S., 121° 55′ E. Banda Sea. 2796 Metres. Grey and green mud, superficial layer more liquid and brown. 1 Spec.
Stat. 254. 5° 40′ S., 132° 26′ E. Arafura Sea. 310 Metres. Fine grey mud. 1 Spec.

Diagnosis. Shell moderately curved, white and transparent with many deeply incised circular lines as in *D. politum*; very slightly compressed between front and back curves, especially near the apex. Greatest swelling at about one third the shell's length from the anterior aperture and tapering gently toward both sides. The outer curve is more bent than the inner and rather suddenly depressed near the anterior aperture. Anterior aperture slightly oblique the margin on the outer curve flattened. Apex sub-circular, with moderately strong walls.

Fig. 37.
Ant. apert. and apical orifice of *Cadulus zonatus*.

Length 14 mill., antero-posterior diam. of apert. 1,5, lateral diam. of apert. 1,35, greatest diam. 2,3 mill. Diam. of apex 0,65 mill.

24. *Cadulus pulcherrimus* n. sp. Pl. VI, figs 58, 59.

Stat. 314. 7° 36′ S., 117° 30′.8 E. Flores Sea. 694 Metres. Fine sandy mud. 6 Spec.

Diagnosis. An exceedingly fine and graceful shell, strongly curved, much attenuated yellowish or grayish white, with many regular obliquely encircling lines, deeply incised in the

way of *D. politum* and as in *Cadulus zonatus*; compressed between the front and back curves. On a frontal view of the inner curve, one sees that the greatest inflation is at about one third the shell's length from the anterior aperture, tapering evenly toward both ends; a lateral view shows hardly any inflation at all but the outer curve is rather suddenly flattened near the anterior aperture, however without the slightest trace of angularity. Anterior aperture very oblique, much flattened in antero-posterior direction, the margin on the outer curve straight. Apex subcircular, thin edged.

Fig. 38. Ant. apert. and apical orifice of *Cadulus pulcherrimus*.

Length 21,5 mill., antero-posterior diam. of apert. 1,1 mill., lateral diam. of apert. 1,5 mill.; greatest diam. 2 mill.; diam. of apex 0,5 mill.

Remarks. Compared to *C. zonatus*, *pulcherrimus* is a far more slender and graceful shell. It is more compressed between front and back curves, and much more attenuated.

*25. *Cadulus singaporensis* Sharp & Pilsbry. Pl. III, fig. 51.

1897. *Cadulus singaporensis* Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 195, pl. 36, figs 30, 31.

Diagnosis. Shell small, very slender, closely striated obliquely with alternate white and translucent bands, smooth and glossy on the larger part, encircled by low, close wrinkles near the apex. Gradually increasing from the apex to quite near the aperture, then contracting moderately on all sides; equator or point of greatest diameter, at about the anterior ninth of the shell's length, the diameter there contained about $7^1/_3$ times in the length. Tube faintly compressed vertically throughout. Aperture not oblique, subcircular; anal orifice simple.
Length 5,6 mill; diam. at aperture $0{,}56 \times 0{,}6$, at greatest $0{,}75 \times 0{,}77$, at apex $0{,}29 \times 0{,}34$ mill. (the antero-posterior dimensions in each case given first). (P. & Sh.).

Distribution. Singapore. (Dr. S. Archer).

26. *Cadulus abrupto-inflatus* n. sp. Pl. VI, fig. 65.

Stat. 5. 7° 46′ S., 114° 30′.5 E. Madura Strait. 330 Metres. Mud. 1 Spec.

Diagnosis. Shell white, pretty strong, both inner and outer curve well-bent. Tube circular, increasing anteriorly but slowly in diameter, until near the anterior aperture it rather suddenly swells into an encircling ring, from which it contracts again rapidly toward the anterior aperture. Apex simple, subcircular, thick-edged. Anterior aperture rounded oval, rather oblique. Length of shell 12 mill., antero-posterior diam. of aperture 1 mill., lateral diam. 1,2. Greatest diam. 2,2 mill., at about $^1/_8$ the shell's length.

Fig. 39. Ant. apert. and apical orifice of *Cadulus abrupto-inflatus*.

*27. *Cadulus laevis* Brazier. Pl. III, fig. 43.

1877. *Dentalium laeve* Brazier, Proc. Linn. Soc. N. S. Wales II, p. 59.
1897. *Cadulus laevis* Brazier. Pilsbry & Sharp, Man. of Conch., vol. XVII, p. 195.
1877. *Cadulus laevis* Brazier. Hedley, Proc. Lin. Soc. N. S. Wales, vol. XXV, p. 499, pl. XXVI, figs 8, 9, 10.
Not *Dentalium laeve* Schlotheim.

Diagnosis. Shell light amber-colour, sometimes white, smooth, glossy, strongly arched, half-moon shaped, basal margin pinched in about two lines long, forming somewhat like a shoulder, then slightly ventricose, from that to the apex regularly tapering apex with a minute perforation entire. Length 28 mill.; diam. of base at shoulder 2; below 1 mill. (BRAZIER).

Distribution. Princess Charlotte Bay, North East Australia, 13 fms, sandy mud; Cape Grenville, North East Australia 20 fms, mud; York Island, Torres Straits, 13 fms, hard mud bottom; Darnley Island, Torres Straits, 5, 15, 20, 30 fms. (Chevert Exp.).

Remarks. The lower part of this species resembles the spines of the sea-urchins (Echinidae). The greater part of the specimens are encrusted over with a fine coating of coral-like substance. (BRAZ.).

In his Manual Mr PILSBRY adds: "Described as a *Dentalium*, the specific name being preoccupied. It seems to be a *Cadulus* or a *Ditrupa*. We have not seen specimens, but the last clause of BRAZIER's observations suggests the latter genus".

Afterwards HEDLEY published the following note with an accompanying figure:

Cadulus laevis Brazier. The author of this species has supplied me with co-types from Darnley I., Torres Straits. The shell selected for illustration measures directly from end to end, that is along the chord of the arc, 26 mm. It is exceptional in having the small end bifid; most are circular and simple. A submedian constriction (marking a rest point in growth?) noted in the original description is present in but few examples and varies in position. The degree of curvature varies, young shells being more bent. All under the lens are concentrically wrinkled throughout their length.

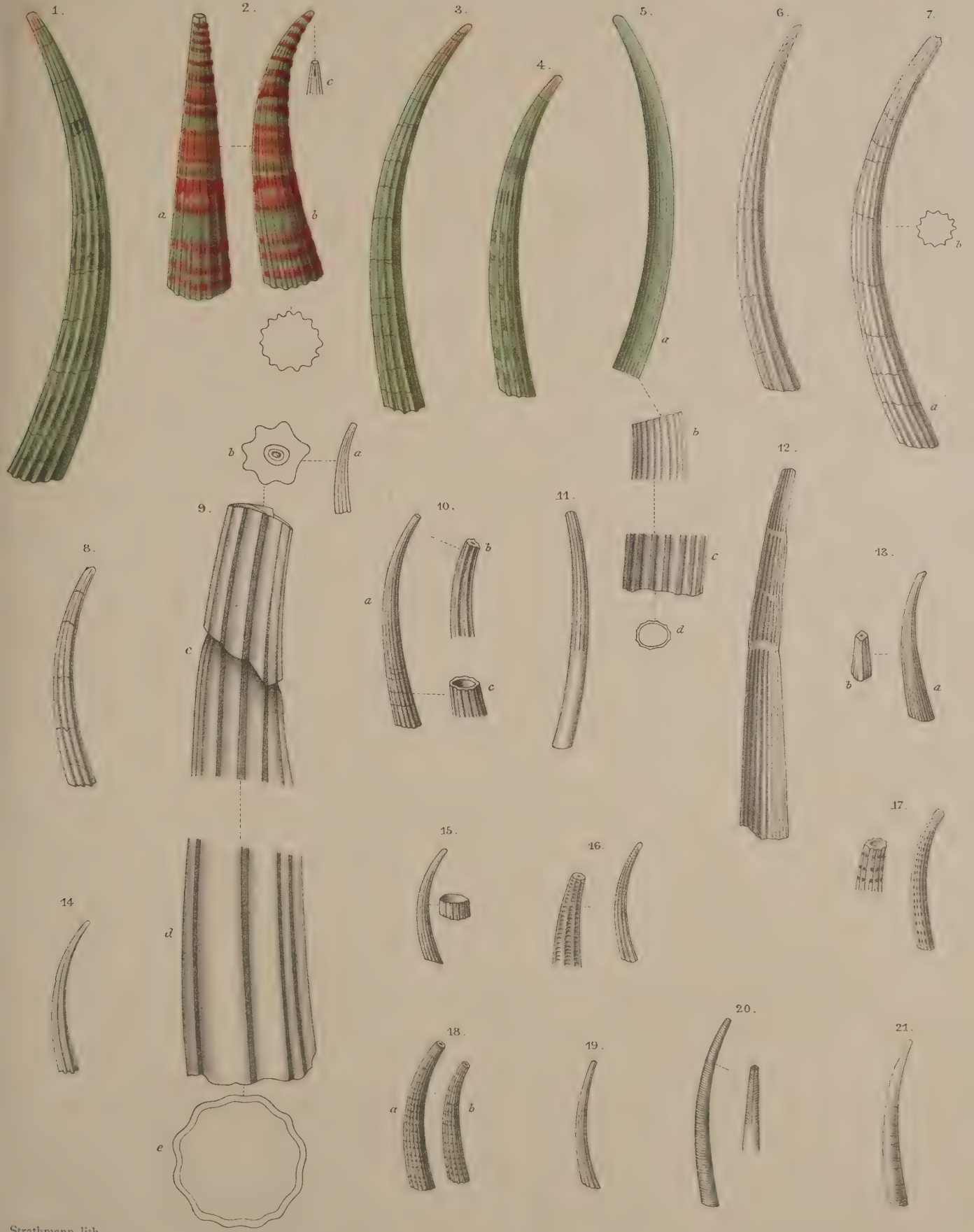
Considering the meagre details at their disposal, Messrs PILSBRY & SHARP estimated with remarkable accuracy the systematic position of the species".

The figure looks dangerously like a *Ditrupa* but on the authority of Mr. HEDLEY it is now considered to be a *Cadulus*.

PLATES.

PLATE I.

Fig. 1. *Dentalium elephantinum* L. From Conch. Icon.
Fig. 2. *Dentalium formosum* Ad. & R. From PILSBRY.
Fig. 3. *Dentalium aprinum* L. From Conch. Icon.
Fig. 4. *Dentalium interstriatum* Sowb. From Conch. Icon.
Fig. 5. *Dentalium Letsonae* P. & Sh. From PILSBRY.
Fig. 6. *Dentalium javanum* Sowb. From Conch. Icon.
Fig. 7. *Dentalium bisexangulatum* Sowb. From Conch. Icon.
Fig. 8. *Dentalium octangulatum* Donovan. From Conch. Icon.
Fig. 9. *Dentalium intercalatum* Gould. From PILSBRY.
Fig. 10. *Dentalium pseudosexagonum* Desh. From Conch. Icon.
Fig. 11. *Dentalium Lessoni* Desh. From DESHAYES.
Fig. 12. *Dentalium Shoplandi* Jouss. From PILSBRY.
Fig. 13. *Dentalium quadrapicale* Sowb. From Conch. Icon.
Fig. 14. *Dentalium hexagonum* Gould. From Conch. Icon.
Fig. 15. *Dentalium porcatum* Gould. From Conch. Icon.
Fig. 16. *Dentalium cancellatum* Sowb. From Conch. Icon.
Fig. 17. *Dentalium variabile* Desh. From Conch. Icon.
Fig. 18. *Dentalium Belcheri* Sowb. From Conch. Icon.
Fig. 19. *Dentalium multistriatum* Desh. From DESHAYES.
Fig. 20. *Dentalium politum* L. From DESHAYES.
Fig. 21. *Dentalium lacteum* Desh. From DESHAYES.

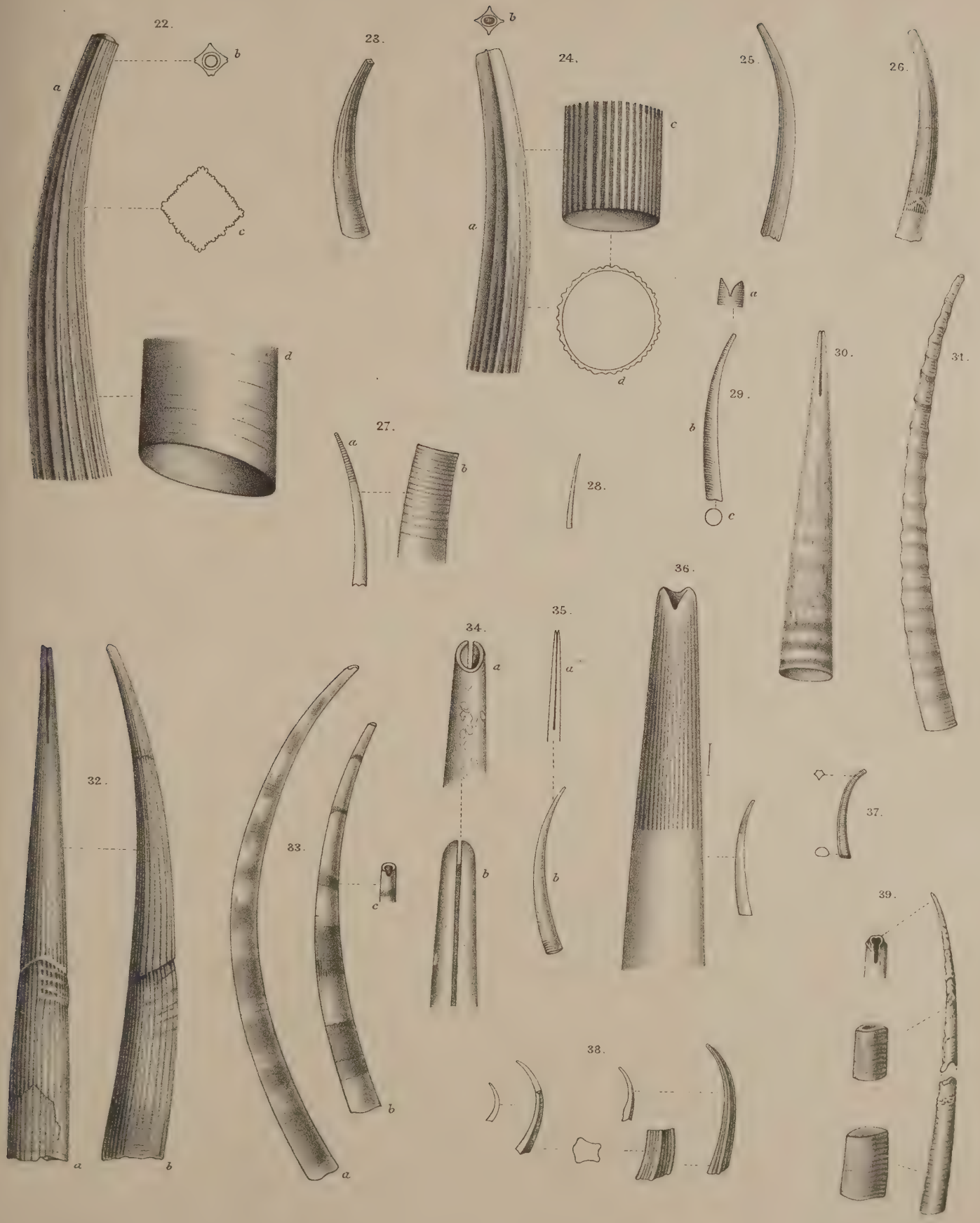


. Strathmann lith.

Fa. P. W. M. Trap, impr.

PLATE II.

Fig. 22. *Dentalium dispar* Sowb. From PILSBRY
Fig. 23. *Dentalium dispar* Sowb. From Conch. Icon.
Fig. 24, 25. *Dentalium dipsycha* P. & Sh. From PILSBRY.
Fig. 26. *Dentalium conspicuum* Melv. (From PILSBRY) (= *D. quadrapicale* Sowb.).
Fig. 27. *Dentalium subtorquatum* Fisch. From Journ. de Conch.
Fig. 28. *Dentalium subrectum* Jeffreys. From PILSBRY.
Fig. 29. *Dentalium bisinuatum* Andre. From PILSBRY.
Fig. 30. *Dentalium Hungerfordi* P. & Sh. From Proc. Zool. Soc. 1888.
Fig. 31. *Dentalium eburneum* L. From Conch. Icon.
Fig. 32, 32*a*. *Dentalium magnificum* Smith. From ALCOCK.
Fig. 33, 33*a*. *Dentalium longitrorsum* Reeve. From Conch. Icon.
Fig. 34, 35. *Dentalium stenoschizum* P. & Sh. From PILSBRY.
Fig. 36. *Dentalium aciculum* Gould. From PILSBRY.
Fig. 37. *Entalina mirifica* Smith. From Ann. & Mag.
Fig. 38. *Entalina platamodes* Wats. From Chall. Rep.
Fig. 39. *Dentalium acutissimum* Wats. From Chall. Rep.



F. Strathmann lith.

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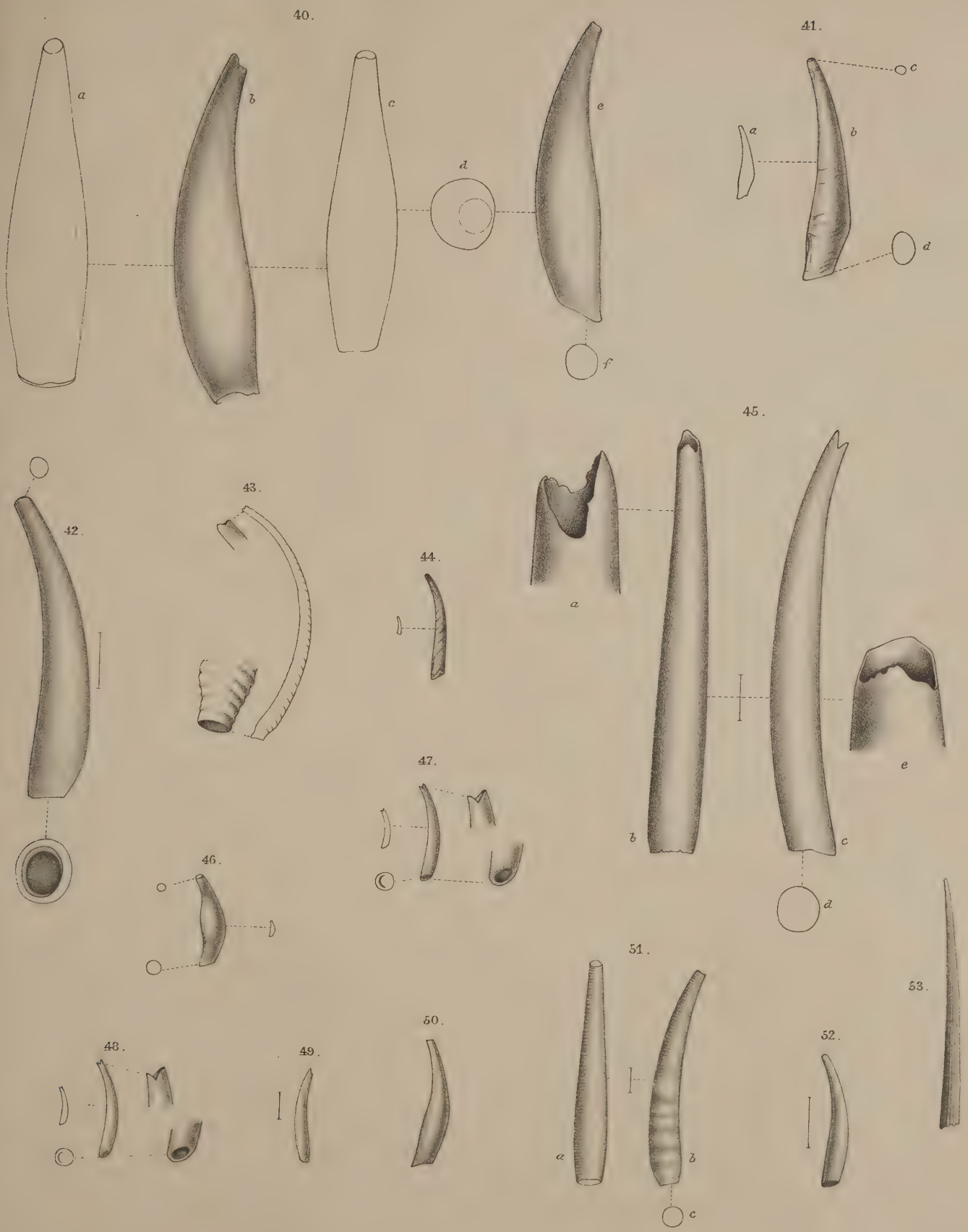
PLATE III.

Fig. 40. *Cadulus gadus* Mont. From PILSBRY.
Fig. 41. *Cadulus colubridens* Watson. From Chall. Rep.
Fig. 42. *Cadulus clavatus* Stimp. From PILSBRY.
Fig. 43. *Cadulus laevis* Braz. From Proc. Linn. Soc. N. S. W.
Fig. 44. *Siphonodentalium eboracense* Wats. From Chall. Rep.
Fig. 45. *Cadulus Belcheri* P. & Sh. From PILSBRY.
Fig. 46. *Cadulus simillimus* Wats. From Chall. Rep.
Fig. 47. *Cadulus prionotus* Wats. From Chall. Rep.
Fig. 48. *Cadulus dichelus* Wats. From Chall. Rep.
Fig. 49. *Cadulus minutus* H. Ad. Proc. Zool. Soc.
Fig. 50. *Cadulus anguidens* M. & S. From PILSBRY.
Fig. 51. *Cadulus singaporensis* P. & Sh. From PILSBRY.
Fig. 52. *Cadulus euloides* M. & S. From Proc. Zool. Soc.
Fig. 53. *Dentalium clathratum* v. Mart. After a photograph of the type specimen.



Strathmann lith.

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[1] PLATE IV.

Fig. 1. *Dentalium interstriatum* Sowb. Spec. of Amsterdam Museum.
Fig. 2. *Dentalium aprinum* L. Spec. of Amsterdam Museum.
Fig. 3—6. *Dentalium aprinum* var. *incolor* nov. var. St. 133 and 163.
Fig. 7. *Dentalium javanum* Sowb. Spec. of Amsterdam Museum.
Fig. 8—9. *Dentalium octangulatum* Don. Spec. of Amsterdam Museum.
Fig. 10—11. *Dentalium eburneum* L. Spec. of Amsterdam Museum.
Fig. 12. *Dentalium eburneum* L. var. Spec. of Amsterdam Museum.
Fig. 13. *Dentalium eburneum* L. var. (= *D. novaehollandiae* Chenu), a spec. from the Mus. d'Hist. Nat. of Paris.
Fig. 14—16. *Dentalium profundorum* E. A. Smith. St. 83 and 101.
Fig. 17—18. *Dentalium Sibogae* nov. spec. St. 159.
Fig. 19. *Dentalium Martensi* nov. spec., a much eroded specimen of St. 88.
Fig. 20—21. *Dentalium semitracheatum* nov. spec. St. 248.
Fig. 22. *Dentalium tracheatum* nov. spec. St. 208.
Fig. 23. *Dentalium transversostriatum*. St. 212.

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1) The figures of Plate IV, V, VI are from photographs in natural size.

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PLATE V.

Fig. 1—3. *Dentalium Martensi* nov. spec. St. 88.
Fig. 4, 5. *Dentalium malayanum* nov. spec. Stat. 300.
Fig. 6—8. *Dentalium usitatum* E. A. Smith. Stat. 88.
Fig. 9—12. *Dentalium acutissimum* Wats. St. 211.
Fig. 13, 14. *Dentalium aciculum* Gould. St. 52 and 133.
Fig. 15. *Dentalium insolitum* E. A. Smith. St. 45.
Fig. 16—20. *Dentalium stapes* nov. spec. Stat. 212.
Fig. 21, 22. *Dentalium pachypleurum* nov. spec. Stat. 271.
Fig. 23, 24. *Dentalium Michelotti* Hoernes. St. 159.
Fig. 25, 26. *Dentalium Macandrewi* n. n. (= *D. lineolatum* Cooke).
Fig. 27. *Dentalium Macandrewi* n. n. (old spec. of *D. lineolatum* Cooke).
Fig. 28—30. *Dentalium Macandrewi* n. n. (= *D. clavus* Cooke).
Fig. 31—34. *Dentalium Macandrewi* n. n. (= *D. aratorum* Cooke).

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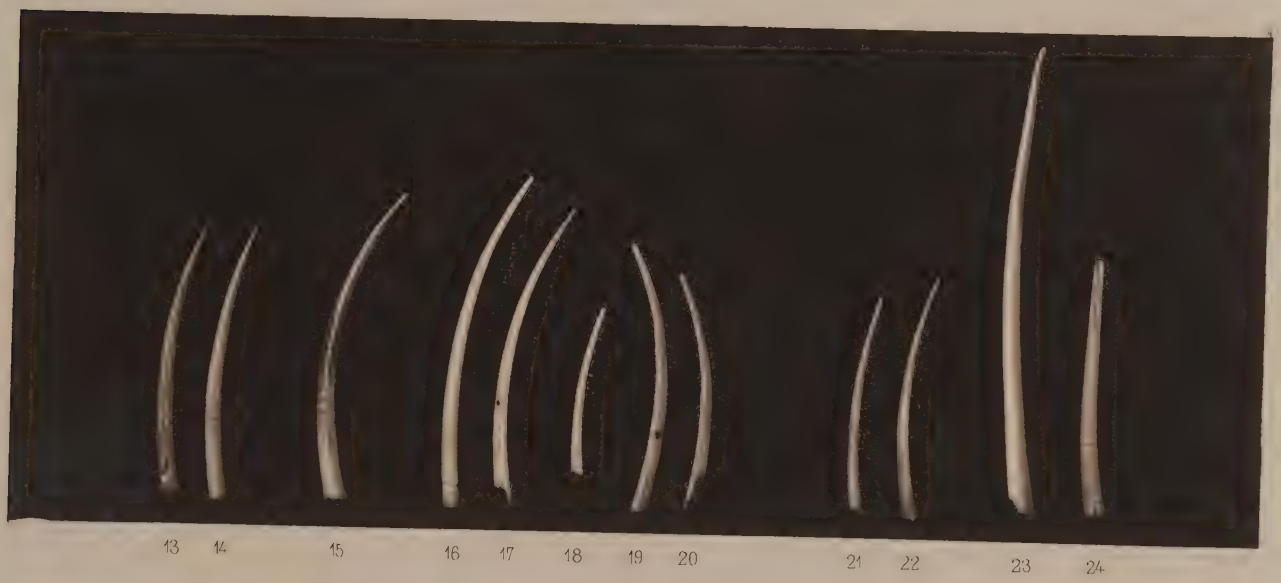
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PLATE VI.

Fig. 1. *Dentalium hexagonum* Gould. Spec. of Amsterdam Museum.
Fig. 2. *Dentalium hexagonum* var. *sexcostatum*. Spec. of Amsterdam Museum.
Fig. 3. *Dentalium minus* nov. spec. St. 319.
Fig. 4. *Dentalium intercostatum* nov. spec. Stat. 314.
Fig. 5. *Dentalium tubiforme* nov. spec. St. 212.
Fig. 6, 7. *Dentalium pluricostatum* nov. spec. St. 153.
Fig. 8—11. *Dentalium sedecimcostatum* nov. spec. St. 88 and 52.
Fig. 12. *Dentalium compressiusculum* nov. spec. St. 241.
Fig. 13, 14. *Dentalium entalis* L. A specimen from Bodö in the Amsterdam Museum.
Fig. 15. *Dentalium entalis* var. *indicum* nov. var. St. 159.
Fig. 16, 17. *Dentalium stenoschizum* P. & Sh. St. 184.
Fig. 18, 19. *Dentalium tenuifissum* Mont. St. 240.
Fig. 20, 21. *Dentalium Cookei* P. & Sh. St. 207.
Fig. 22. *Dentalium sinuosum* nov. spec. St. 294.
Fig. 23. *Dentalium leucoryx* nov. spec. St. 285.
Fig. 24. *Dentalium oryx* nov. spec. Stat. 302.
Fig. 25—28. *Dentalium paucicontortum* nov. spec. St. 95.
Fig. 29. *Dentalium robustum* Braz. St. ?
Fig. 30. *Dentalium banale* nov. spec. St. 300.
Fig. 31, 32. *Dentalium aciculum*? Specimens of the Amsterdam Museum labelled together with *D. lacteum* Desh., but striated near the apex.
Fig. 33. *Dentalium truncatum* nov. spec. St. 256.
Fig. 34. *Dentalium tasmaniense* Ten. Woods. St. 302.
Fig. 35. *Dentalium lacteum* Desh. Spec. of Amsterdam Museum.
Fig. 36. *Dentalium subtorquatum* Fisch. St. 260.
Fig. 37. *Dentalium tetrapleurum* nov. spec. St. 4.
Fig. 38, 39. *Dentalium annulosum* Braz. St. 314.
Fig. 40, 41. *Dentalium tricarinatum* nov. spec. St. 178.
Fig. 42—45. *Dentalium carneum* nov. spec. St. 300.
Fig. 46. *Dentalium subrectum* Jeffreys. St. 4.
Fig. 47—50. *Dentalium subrectum* Jeffreys. Specimens collected by Prof. SLUITER near Batavia.
Fig. 51. *Cadulus dichelus* Wats.
Fig. 52. *Cadulus ovalis* nov. spec. St. 51.
Fig. 53. *Cadulus hexaschistus* nov. spec. St. 178.
Fig. 54. *Cadulus magnus* nov. spec. St. 45.
Fig. 55, 56. *Cadulus longilobatus* nov. spec. St. 133.
Fig. 57. *Cadulus zonatus* nov. spec. St. 214.
Fig. 58, 59. *Cadulus pulcherrimus* nov. spec. St. 314.
Fig. 60—64. *Cadulus virginalis* nov. spec. St. 52, 208 and 284.
Fig. 65. *Cadulus abrupto-inflatus* nov. spec. St. 5.
Fig. 66. *Cadulus colubridens* Wats. St. 211.
Fig. 67. *Cadulus pseudolivi* nov. spec. St. 211.
Fig. 68. *Siphonodentalium australasiae* nov. spec. St. 211.
Fig. 69. *Entalina cornucopiae* nov. spec.
Fig. 70—72. *Entalina mediocarinata* nov. spec. St. 5 and 256.
Fig. 73—75. *Entalina quadrangularis* nov. spec. St. 88 and 151.
Fig. 76—78. *Entalina platamodes* Wats. St. 211.
Fig. 79, 81, 83. *Dentalium stapes* nov. spec. St. 212.
Fig. 80, 82, 84. *Dentalium insolitum* E. A. Smith. St. 300.
Fig. 85, 86. *Entalina quadrangularis* nov. spec. Stat. 88 and 151.
Fig. 87, 88. *Entalina mediocarinata* nov. spec. St. 5 and 256.
Fig. 89. *Entalina cornucopiae* nov. spec. St. 52.

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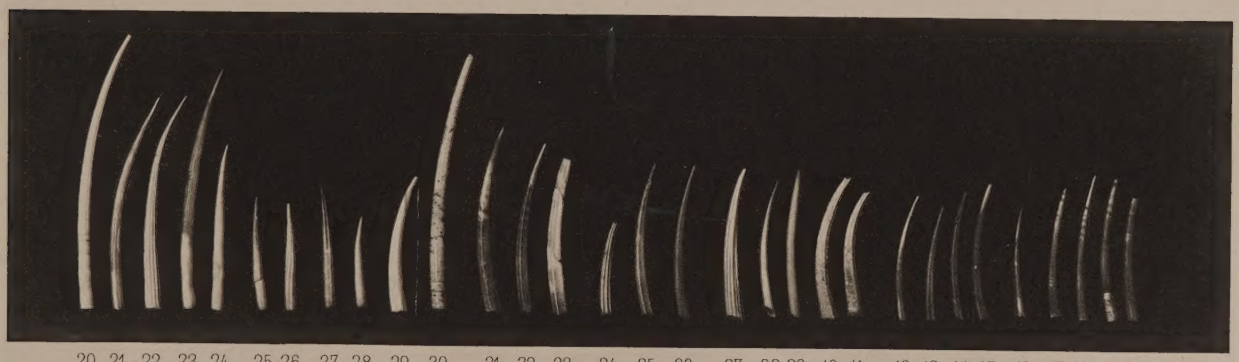

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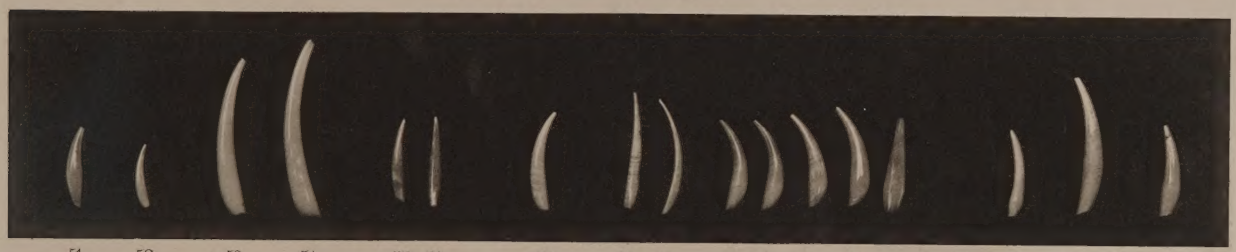

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